UNITED STATES DISTRICT COURT WESTERN DISTRICT OF NEW YORK

IRISH CARBONIC COMPANY,

Plaintiff,

DECISION AND ORDER 97-CV-2935

ARCHER-DANIELS-MIDLAND COMPANY and TERRANCE S. WILSON,

Defendants.

### INTRODUCTION

scheduled to start trial on October 10, 2000. On July 19, 2000, Defendant filed a Motion in Limine (Docket No. 82). On July 19, 2000 and July 21, 2000, Plaintiff filed its Motion in Limine (Docket Nos. 81 & 84). This Decision and Order will first address Defendant's Motion in Limine and will then proceed to Plaintiff's Motion in Limine. In considering each motion, this Court will rule on the admissibility of the given evidence in the order presented by that particular motion. In addition, this Court will discuss the parties' proposed jury charges.

### DEFENDANT'S MOTION IN LIMINE

### PRIOR CONVICTIONS

2. Defendant's first request for relief involves the use of criminal convictions for price-fixing. Plaintiff concedes that it intends to introduce evidence regarding the

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<sup>&#</sup>x27;These motions cover the same request for relief. Plaintiff filed the second motion because no "Notice of Notion" was filed with its first Motion in Limins.

criminal convictions of ADM, Michael Andreas, and Terrance Wilson for price-fixing in the sale of lysine and citric acid products. Defendant seeks to preclude any evidence regarding these criminal convictions.

- 3. This Court will exclude ADM's conviction from evidence at trial. ADM, as a corporation, is not a witness and, therefore, cannot be impeached with this conviction. Moveover, ADM's criminal conviction cannot be used under Federal Rule of Evidence 609 to impeach the credibility of any ADM employee who will testify at trial as long as the potential witnesses were not "directly connected to the underlying criminal act." Walden v. Georgia-Pacific Corp., 128 F.3d 506, 510 (3rd Clr. 1997), cert. denied, 523 U.S. 1074, 118 S.Ct. 1516, 140 L.Ed.2d 669 (1998). As the Third Circuit has stated, "it strains logic to argue that an employee's credibility is properly brought into question by the mere fact that he or she is presently employed by a corporation that in some unrelated manner was guilty of dishonest acts, no matter how egregious those acts may have been." Walden, 126 F.3d at 523-24.
- 4. This Court will also exclude the conviction of Michael Andreas. Neither party has listed Andreas as a potential witness; therefore, any evidence regarding his criminal conviction is excluded. See United States v. Esson, 920 F.2d 731, 735 (11th Cir. 1990)("It is clear that a conviction other than that of the witness himself is not admissible on the issue of the witnesses' credibility."); United States v. Austin, 786 F.2d 986, 992 (10th Cir. 1986)("We have found no case . . . in which a conviction other than that of the witness himself was properly admitted on the issue of his

credibility."); United States v. Lipps, 659 F.2d 960, 962 (9th Cir. 1981)(Rule 609(a) "does not authorize the introduction of a defendant's prior convictions to impeach another witness.").

- 5. With regards to Terrance Wilson, this Court notes that all claims against Wilson as an individual were dismissed in this Court's March 31, 2000 Decision and Order. ADM does not intend to call Wilson as a witness, but Plaintiff has Wilson listed as a potential witness and has also earmarked his deposition testimony to be read at trial. From the parties' submissions, it seems clear that the Defendant is incarcarated and will be unavailable to testify at trial.
- 6. Under Federal Rule of Civil Procedure 32(a)(3)(C), Plaintiff may be able introduce Wilson's deposition testimony at trial, subject to the normal evidentiary rules. See Federal Rule of Civil Procedure 32(a)(3)(c) ("deposition of a witness, whether or not a party, may be used by any party for any purpose if the court finds ... that the witness is unable to attend or testify because of ... imprisonment,"); Federal Rule of Evidence 804(b)(1) (former testimony given at deposition may be exception to hearsay rule). Although Defendant argues that Wilson's testimony is no longer relevant or probative to this case, it has not moved to preclude Wilson's deposition testimony. As no motion to exclude Wilson's testimony is currently pending, this Court will not make a determination as to whether such testimony would be admissible at trial.

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However, "when a hearsay statement . . , has been admitted into evidence, the credibility of the declarant may be attacked, and if attacked may be supported, by any evidence which would be admissible for those purposes if declarant had testified as a witness." Federal Rule of Evidence 806. See also United States v. Saada, 212 F.3d 210, 221-22 3rd Cir. 2000) (noting that the credibility of a hearsay declarant may be impeached with evidence of criminal convictions under Rule 609). Further, "(t)he credibility of a witness may be attacked by any party, including the party calling the witness," Federal Rule of Evidence 607. See also United States v. Freeman, 302 F.2d 347, 351 (2¢ Cir. 1962), 375 U.S. 958, 84 S.Ct. 448, 11 L.Ed.2d 316 (1963). Therefore, if such testimony is admissible at trial, then Wilson is considered a "witness" who may be impeached even if called by Plaintiff and not Defendant. However, as discussed above, Wilson's testimony cannot be used to impeach any other witness

7. Whether or not Wilson's conviction would be admissible as impeachment evidence, however, must be determined by a review of Federal Rule of Evidence 609 ("Rule 609"). Plaintiff suggests that Wilson's prior conviction is admissible under Rule 609(a)(2) or, In the alternative, Rule 609(a)(1). The main difference between these sections is that a Rule 609(a)(2) crime is not subject to exclusion because its prejudicial effect outweighs its probative value. To qualify as a Rule 609(a)(2) crime, the crime fdr which Wilson was convicted must involve "dishonesty or false statement." Rule 609. Where faisity or deceit is not an element of the crime, courts

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may "look beyond the elements of the offense to determine whether the conviction rested upon facts establishing dishonesty or false statement." <u>United States v. Payton</u>, 158 F.3d 49, 56 (2nd Cir. 1998), <u>citing</u>, <u>United States v. Haves</u>, 563 F.2d 824, 827 (2d Cir. 1977), <u>cart. denied</u>, 434 U.S. 867, 98 S.Ct. 204, 54 L.Ed.2d 143 (1977). However, the party offering the conviction as evidence bears the burden of showing that the circumstances of the crime involved deceit or faisity. <u>See Haves</u>, 553 F.2d at 827.

8. In this case, Pleintiff has submitted the Seventh Circuit's June 26, 2000 Decision and Order discussing Wilson's appeal of his conviction to show that the underlying crime did in fact involve falsity and deceit. Wilson's participation in the price-fixing scheme involved attending meetings purposefully set in cities outside of the jurisdiction of Untied States antitrust laws. In addition, Wilson participated in disguising the purpose of price-fixing meetings by creating fake agendas and a fictitious trade association so that the suspicions of oustomers and law enforcement agencies would not be raised. See United States v. Andress, 2000 WL 816078 (7th Cir. June 26, 2000) (affirming convictions of Michael Andress and Terrance Wilson and remanding for resentencing with enhancement for leadership roles for both defendants). Under these facts, this Court finds that Wilson's conviction would be admissible for impeachment purposes under Rule 609(a)(2).

Even if this conviction does not rise to the level of a Rule 609(a)(2) crime, this Court finds that it would be admissible under Rule 609(a)(1) because its probative

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value outweldns any prejudicial effect. Several factors lead to this conclusion: (1) this conviction is very recent and, therefore, has greater probative value; (2) this conviction has great profative value on Wilson's credibility as his crime includes various forms of deceit employed to break antitrust laws and to hide this illegal conduct; (3) Wilson's conviction was for a crime substantially different from the instant contract action so as not to projudice the Defendant. See Haves, 553 F.2d at 827-28 (internal citations omitted). See also Daniels v. Loizzo, 986 F.Supp. 245, 260 (S.D.N.Y.1997)(Courts have often identified four factors that should be considered in balancing probative against prejudicial effect: (1) the impeachment value of the prior crime, (2) the remoteness of the prior conviction, (3) the similarity between the past crime and the conduct at issue, and (4) the importance of the credibility of the witness). The only other factor for consideration is the importance of the witness' credibility. Here, Defendant argues that Wilson's testimony is irrelevant, but Plaintiff points to Wilson's dealings with BOC and his role in finalizing the sale of ADM's CO2 to BOC. Although the parties did not brief this issue at any length, a review of their exhibits leads me to believe that, Wilson's testimony is not critical to Plaintiff's case. For these reasons, this Court will preliminarily allow Wilson's conviction into evidence only as impeachment material provided that his deposition testimony is otherwise admissible under the Felieral Rules of Evidence. However, this Court will not allow Wilson's conviction as direct evidence of any wrongdoing or as impeachment evidence of any other witness. Further, this Court will allow Defendant to formally object to Wilson's

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deposition testimony as long as it identifies the rule or rules under which it makes its objection and files with the Clerk of the Court and serves its objection by Monday, September 1.1, 2000. Plaintiff can file with the Clerk of the Court and serve a response to any such objection by Monday, September 18, 2000. Defendant may file with the Clerk of the Court and serve any reply thereto by Monday, September 25, 2000. Because of the limited amount of time available to resolve this motion before trial, this Court requests that the parties to deliver a courtesy copy of their submissions to Chambers.

### SIZE AND WEALTH OF ADM

9. Plext, Defendant argues that Plaintiff should be precluded from offering any evidence regarding the size and wealth of ADM because such evidence is irrelevant. Plaintiff argues that ADM's size and wealth are relevant to determining whether it's reliance was upon ADM's representations was reasonable. As ADM's punitive damages claims have been dismissed, this Court finds that evidence of ADM's wealth is not relevant to a determination of reasonable reliance and, even if relevant, such evidence is unduly prejudicial. Therefore, this Court will exclude any evidence of ADM's wealth. This Court will not, however, exclude all evidence regarding the size of ADM. For example, evidence that Defendant was only using 22% of its available CO<sub>2</sub> supply or that Defendant's CO<sub>2</sub> sales were only a small portion of its overall

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business would be relevant to this case, but the fact that it had \$13 billion dollars in gross sales would not:

## SIMILAR TREATMENT OF OTHER CO. DISTRIBUTORS

regarding "business dealings between ADM and any other CO<sub>2</sub> distributor." Plaintiff agraes that it will not offer evidence about misrepresentations made to other distributors, but will offer evidence of ADM's prior negotiations with other CO<sub>2</sub> suppliers as well as ADM's prior attempts to sell its CO<sub>2</sub>. Plaintiff asserts that such evidence is relevant to the truth or falsity of representations made by Mr. Baroni as well as his duty to inquire into ADM's intentions in the market. Without more information, this Court will not exclude evidence regarding ADM's prior negotiations with other CO<sub>2</sub> suppliers and its attempts to sell its CO<sub>2</sub> at this time. However, all such evidence must comport with the Federal Rules of Evidence. For example, Robert Irish's testimenty that he "heard" ADM had made certain representations to two other CO<sub>2</sub> distributors would be excluded as hearsay evidence unless Plaintiff can show that it fits a specific exception under the rules.

## EXPERT TESTIMONY OF ROBERT IRISH

11. This Court will now address the Defendant's fourth request for relief seeking to preclude Robert Irish from testifying as an expert. Irish is expected to render

expert testimony on three issues: (1) that Plaintiff would have sold nine million pounds of dry ice block per year for the remainder of its contract with ADM; (2) Plaintiff's expected selling prices for 1996 through 1999; and (3) ADM's estimated sales price of CO<sub>2</sub>. Defendant argues that Plaintiff's first two opinions are irrelevant because Plaintiff's damages are limited to the maximum quantity term under the contract. Defendant also argues that Plaintiff is not competent to render his third opinion as to ADM's estimated sales price and that this opinion is speculative and unreliable.

- 12. This Court will allow Robert Irish to testify as to Irish's dry ice block business as it is relevant to whether Irish Carbonic reasonably relied upon ADM's representations when making investments in its Clinton Street facility.
- 13. This Court will also allow Irish to testify as to Irish Carbonio's selling prices for the years of 1996 through 1999. However, as the actual selling prices are available, this Court finds that Irish's prior predictions as to the selling prices for these years are relevant. First, Mr. Irish's prior predictions are the same as Irish Carbonic's actual selling prices for these years. Second, Plaintiff's theory of damages is based upon the difference between its purchase price from BOC as compared to that of ADM under the contract. Thus, Irish Carbonic can rely upon its actual selling prices to prove its damages instead of prior predictions.
- 14. This Court will exclude any testimony by Mr. Irish as to ADM's possible selling price under the remaining years of the contract. While such an opinion may be relevant to the issue of damages, Mr. Irish is not qualified to testify as to what ADM

may or may not have done. However, Mr. Irish may testify to any relevant matters to which he has personal knowledge such as his business dealings with ADM, the actual prices that Irish Carbonic paid under the contract, and his reasons for entering into the contract with ADM. Mr. Irish may also testify as to his knowledge of the CO<sub>2</sub> market as a salesman and purchaser, his knowledge and dealings with the "Big 3" suppliers, and the effect of ADM's entry into and exit out of the CO<sub>2</sub> market. This Court finds that Mr. Irish's personal knowledge of the events at issue and his practical experience in the industry qualify him to testify as to these matters.

### EXPERT TESTIMONY OF LAWRENCE SOUTHWICK

his Court will now address the Defendant's flith request for relief seeking to exclude the expert testimony of Lawrence Southwick pursuant to Federal Rule of Evidence 702. Defendant argues that Southwick's testimony is not relevant to any issue in this case. Defendant also stated that it would not contest the reliability of Southwick's report at this time, but would challenge its reliability at trial if necessary. Paintiff argues that Southwick's testimony is relevant to damages and its reasonable reliance. Southwick is expected to offer three opinions: (1) that ADM's removal form the market caused a 20% increase in the CO<sub>2</sub> price index, thereby increasing irish's purchase price of CO<sub>2</sub>; (2) that Irish Carbonic's sales would have grown as a result of its relationship with ADM; and (3) that Irish Carbonic suffered damages as a result of the increase in its purchase price because of its status as a

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"discriminating monopolist." After reviewing Southwick's expert report, this Court finds that his testimony is relevant to the amount of damages due to breach of contract and to the Plaintiff's reasonable reliance upon representations made by the Defendant. For these reasons, this Court will allow Southwick's expert report.

### ROBERT IRISH'S "DIARY"

- "diary" from direct evidence while seeking permission to use this diary as impeachment evidence. On July 1, 1999, this Court issued a decision from the bench denying Defer dant's Motion to Dismiss the Complaint for bad faith conduct. However, I noted that a primary aspect of a court's inherent power is "the ability to fashion an appropriate sanction for conduct which abuses the judicial process." Chambers V, NASCO, Inc., 501 U.S. 32, 44-45, 111 S. Ct. 2123, 2133, 115 L. Ed. 2d 27 (1991) Although this Court chose not to dismiss Plaintiff's Complaint, this Court did note that Robert Irish's conduct raised "serious concerns." Further, this Court recognized that Mr. Irish's conduct—in the preparation of Exhibit 25, the disposal of his original, contemporaneous notes, and his less-than-forthcoming answers during his deposition—cauld not be excused.
- 17: In order to sanction this conduct, this Court will exclude Mr. Irish's diary from direct evidence. Thus, Plaintiff cannot rely upon this diary to prove its claims.

  However, this Court will allow this diary into evidence as impeachment evidence.

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bearing directly on Mr. Irish's credibility. This Court will also consider an appropriate charge to the jury on evidence admitted for a limited purpose. Defendant may file with the Clerk of the Court and serve such a charge accompanied by legal authority by Monday, September 11, 2000. Although Plaintiff should not rehash its arguments against this sanction; this Court will allow Plaintiff to file with the Clerk of the Court and serve any objections to this charge on Monday, September 18, 2000.

### MARCH 31 D&O: CONTRACT PRICE TERM

- 18. This Court will now move to Defendant's seventh request for relief. In this request, Defendant argues that this Court's March 31, 2000 Decision and Order decided only that there were triable issues of fact regarding what the parties intended with respect to the price term in the contract and, therefore, both parties should be allowed to submit evidence on this issue at trial. Plaintiff argues that this Court definitively found that the five-year contract between the parties was enforceable as written. This Court agrees with Plaintiff's position.
  - 19. In this Court's March 31, 2000 Decision and Order, this Court found that the contract was enforceable as written from the plain meaning of the language of the agreement. See Tique v. Commercial Life Ins. Co., 219 A.D.2d 820, 821, 631 N.Y.S.2d 974, 975 (4th Dep't 1995)("[T]he court must ascertain the intent of the parties from the plain meaning of the language employed, giving terms their plain, ordinary, popular and non-technical meanings."); American Express Bank, Ltd. v.

Uniroval. Inc., 164 A.D.2d 275, 277, 562 N.Y.S.2d 613, 614 (1st Dep't 1990) (internal quotations omitted), appeal denied, 77 N.Y.2d 807, 569 N.Y.S.2d 611, 572 N.E.2d 52 (1991) (where 'the intent of the parties can be determined from the face of the agreement, interpretation is a matter of law', and a claim turning on that interpretation may thus be determined by summary judgment or by dismissal).

20. Further, Defendant's argument that the parties' intent is an issue under New York's Uniform Commercial Code § 2-305(4) is misplaced. Defendant relied upon this same subsection in its argument for summary judgment and this Court rejected its argument. Therefore, the only issue remaining for trial is whether ADM breached its contract with Irish Carbonic. The parties may, of course, submit evidence on the issue of whether ADM would have increased it prices under the contract and if Irish Carbonic would have accepted these prices. This Court also notes that under New York's U.C.C. § 2-305(2) states that "[a] price to be fixed by the seller or by the buyer means a price for him to fix in good faith."

### MARCH 31 D&O: MAXIMUM ANNUAL QUANTITY

21. In its eighth and last request, Defendant argues that although this Court decided that Plaintiff's damages are limited to the quantity term of the contract, it did not decide how much the parties intended the maximum quantity term to be. Plaintiff argues that this Court determined the maximum quantity term to be 15,000 tons per year.

- n its summary judgment motion, ADM sought to limit its damages to the "unambiguous maximum quantity term in the contract." (Dooket No. 53, pp. 14-16; Docket No. 65, p. 3). ADM also noted that 1, 250 monthly limit in the contract equaled 15, 000 tons per year. (Docket No. 77, pp. 2-3). In its March 31, 2000 Decision and Order, this Court noted that: "When annualized, the monthly maximum equals 15, 000 tons per year. Defendants argue that this figure represents the extent of its obligations under the contract." (March 31, 2000 Decision and Order, p. 29). This Court then went on to hold that the Plaintiff's claims of damages would be limited to the quantity term. Defendant never filed a motion for reconsideration or objected to this determination in any other manner. Now, however, the Defendant seeks to introduce evidence at trial regarding what the parties intended the maximum quantity term to be.
- 23. Sefore discussing the contract and my decision, this Court notes that Defendant, in support of its argument, failed to submit any evidentiary materials that would suggest extrinsic evidence is necessary for a determination on this issue. In fact, Plaintiff points out that this Court rejected its argument, made in opposition to summary judgment on this issue, that the parties intended that ADM would supply more than the contract limit and that the maximum quantity was a question of fact.
- 24. The contract between ADM and Irish Carbonic specifies that: "Buyer shall purchase during the term of this contract 80 percent of its requirements at its facility(s) located at Buffelo, NY. Said requirements are estimated to be 10, 000 tons

per year with peak requirements not exceeding 1250 tons in any single month."

(Hogan Affidavit, Exhibit B). The contract clearly states the quantity to be purchased:

80% of the buyer's (Irish Carbonic) requirements.

- 25. This Court finds that the doctrine of law of the case bars re-litigating the question of the maximum amount of CO<sub>2</sub> under the quantity term of the contract. See Liona Corp. v. PCH Assocs. (In Re PCH Assocs.), 949 F.2d 585, 592 (2d Cir. 1991)("Law of the case rules have developed to maintain consistency and avoid reconsideration of matters once decided during the course of a single continuing lawsuit. These rules do not involve preclusion by final judgment; instead, they regulate judicial affairs before final judgment.")
- 26. This Court will now specify the import of its holding based upon the contract and the representations made by the parties. First, the maximum amount of 15, 000 tons per year refers to the Irish Carbonic's requirements. Thus, the contract specifies that Irish Carbonic's maximum requirement is 1250 tons in a single month or 15, 000 per year. Based on these conditions, Irish Carbonic was required to buy 80% of its requirements from ADM. Thus, Irish Carbonic was required to purchase from ADM anywhere from 8,000 tons of CO<sup>2</sup> per year to 12, 000 tons of CO<sub>2</sub> per year. Thus, this Court reiterates that Plaintiff's damages for lost profits due to breach of contract are limited to the quantity term of the contract. The parties may, however, offer evidence at trial as the extent of Plaintiff's alleged damages within these confines.

## PLAINTIFF'S MOTION IN LIMINE

## EXPERT TESTIMONY OF ERICH SPECKIN: INK ANALYSIS

- 27. This Court will now resolve Plaintiff's Motion in Limine. Pursuant to Federal Rules of Evidence 403, 608(a), and 702, Plaintiff seeks to exclude the expert testimony of Erich Speckin. Speckin is expected to testify as to the results of ink-dating and impression analyses that he performed on Robert Irish's "diary." Plaintiff argues that Speckin's expert opinion testimony is unreliable, irrelevant, likely to mislead and confuse the jury, not offered as to "character for truthfulness or untruthfulness," and that its probative value is outweighed by its prejudicial affect.
- 28. In light of this Court's decision to allow Defendant to impeach Robert Irish on his diary and after reviewing the expert reports and other materials submitted by Speckin, this Court will allow Speckin to testify as an expert. First, this Court finds that ink-dating analysis and an Electro Static Detection Appearatus ("ESDA") impression analysis are reliable methods under <u>Daubert v. Merrell Dow Pharmaceuticals</u>, Inc., 509 U.S. 579, 113 S.Ct. 2786, 125 L.Ed.2d 469 (1993). Second, this Court finds that the results of such testing are competent evidence. <u>See Calloway v. Fichter.</u> No. 97-CV-617, December 30, 1998 Decision and Order, p. 7(Docket No. 35)(dating of documents by the use of experts analyzing the ink is competent evidence)(Scott, MJ)<sup>2</sup>; <u>Janopoules v. Harvey L. Walner & Assoc., Ltd.</u>, 866 F.Supp. 1086, 1095-96 (N.D. III. 1894)(same); <u>Aptix Corp. v. Quickturn Design</u>

The actual filed copy of this decision uses "97CV067" in the caption. The correct case number is 97-CV-617.

Systems, inc., NO. 98-00762. 2000 WL 852813. \*8-9, 24 (N.D.Cai. Jun 14, 2000) (relying upon ESDA impression analysis performed by Expert Speckin). Third, after reviewing his qualifications, this Court finds that Erich Speckin is competent to testify as an expert in these matters. Fourth, this Court finds this testimony highly relevant to the credibility of Robert Irish. However, although Speckin will be allowed to testify as to his conclusions contained in his expert reports, he will not be allowed to testify as to whether he believes Robert Irish to be credible. For example, Speckin can testify that missing or out-of-sequence impressions are inconsistent with copying over a consecutive chronological diary in the manner stated by Robert Irish, but he cannot say that Robert Irish was untruthful in his testimony. For the foregoing reasons, this Court will allow Erich Speckin to testify as an expert in this case.

## PROPOSED JURY CHARGES

29. This Court has reviewed the parties' proposed jury charges and would like the parties to review the following additional charges from Bender's New York Forms of Jury Instruction:

## Uniform Commercial Code Charges

<u>Definitions</u>	Formation of Contracts
•§39.04 Seller	• \$39.50 Formation of Contracts/Sale
•§39.05 Buyer	• §39.51 Offer and Acceptance Generally
•§39.08 Contract/Contract of Sale	• §39.52 Offer Defined

•539.10 Contract Terms	• § 39.54 Acceptance Generally
•§39.1 Good Faith	<u>Open Terms</u>
• §39.12 Course of Dealing	• §39.130 One Party to Set Price (second
. • \$39.14 Course of Perform	nance paragraph: set price in good faith)

### Contracts Generally

Formati	on of Contract	Implied Covenant of Good Faith
• \$2.01	Contract	•\$5.80 Implied Covenant of Good Faith
-\$2,02	Oral Contracts	Damages
•\$2.03	Written/Oral Contracts	•\$6.01 Introductory Instruction
. •\$2.20	Offer and Acceptance	•§6.02 General Measure of Damages
• \$2.21	Offer Defined	•§6.04 Damages/Proximate Cause
<b>*</b> §2.24	Acceptance Defined	
+52.40	Consideration	

In reviewing these charges, the parties should consider whether these charges are applicable to this case and, if applicable, whether these charges are necessary or, at least, would be useful to the jury. Further, the parties should compare the U.C.C. charge with those under "Contracts Generally" to see which charges would be more beneficial in this case. For example, both the U.C.C. section and the "Contracts Generally" section have charges on "good faith" and "acceptance." The parties should determine which language is more appropriate in this case.

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FURTHER, Defendant may object to the admission of Terrance Wilson's deposition testimony into evidence as long as it identifies the rule or rules under which it makes its objection and files with the Clerk of the Court and serves its objection on or before Monday. September 11, 2000.

FURTHER, Plaintiff shall file with the Clerk of the Court and serve a response to Defendant's objection on or before Monday, September 18, 2000.

FURTHER, Defendant shall file with the Clerk of the Court and serve any reply thereto on or before Monday, September 25, 2000.

FURTHER, Defendent shall file with the Clerk of the Court and serve a jury charge on evidence admitted for a limited purpose regarding Robert Irish's diary on or before Monday, September 11, 2000.

FURTHER, Plaintiff shall file with the Clerk of the Court and serve any objections to Defendant's proposed jury charge on evidence admitted for a limited purpose regarding Robert Irish's diary on or before Monday, September 18, 2000.

FURTHER, both parties shall file with the Clerk of the Court their supplemental proposed jury charge submissions, as detailed above, on or before Monday, September 11, 2000.

FURTHER, the parties shall file with the Clerk of the Court and serve any objections to new proposed charges on or before Monday, September 18, 2000.

Dated: August 31, 2000 Buffelo, New York

WILLIAM M. SKRETNY United States District Judge

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### Standard Guide for Test Methods for Forensic Writing Ink Comparison<sup>1</sup>

This standard is issued under the fixed designation E 1422; the number immediately following the designation indicates the year of original adoption or, is the case of revision, the year of last revision. A number in pare otheres indicates the year of last reapproval. A superscript speilon (4) indicates an editorial change since the last revision or reapproval.

#### INTRODUCTION

This guide is intended to be a general guide for forensic ink examinations, both for the experienced document examiner (E 444) and for forensic ink comparison specialists. The aim is to include those techniques that will provide the most information about an ink with the least damage to the document. Therefore, this guide refers to well-reported and thoroughly tested techniques currently in use by document examiners in general practice and dedicated forensic ink comparison facilities.

By following the procedures outlined here, an examiner can accurately discriminate ink formulas and reduce the possibility of false matches of ink samples from different sources or incorrect differentiation of ink samples with a common origin.

#### 1. Scope

1.1 This Guide is intended to assist forensic examiners comparing writing or marking inks. Included in this analysis scheme are the necessary tools and techniques available to reach conclusions as to the common or different origin of two samples of ink.

1.2 Identifying ink formulas as to their manufacturer or time of manufacture as well as performing ink dating examinations are beyond the scope of this guide.

1.3 This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

### 2. Referenced Documents

- 2.1 ASTM Standards:
- D 1535 Test Method of Specifying Color by the Munsell
- E 131 Terminology Relating to Molecular Spectroscopy<sup>3</sup>
- E 284 Terminology of Appearance<sup>4</sup>
- E 444 Guide for Descriptions of Scope of Work Relating to Forensic Document Examiners<sup>4</sup>
- 2.2 NIST Standards:

NBS Standard Sample No. 2106 ISCC-NBS Centroid Color Charts<sup>5</sup>

NBS Special Pub. 440 Color: Universal Language and Dictionary of Names<sup>5</sup>

### 3. Terminology

- 3.1 Definitions:
- 3.1.1 chromatography—a method of separating substances that is widely used in analytical and preparative chemistry. It involves the flow of a liquid or gas mobile phase over a solid or liquid stationary phase. As the mobile phase flows past the stationary phase, a solute will undergo repeated adsorption and desorption and move along at a rate depending, among other factors, on its ratio of distribution between two phases. If their distribution ratios are sufficiently different, components of a mixture will migrate at different rates and produce a characteristic pattern (chromatogram).
- 3.1.2 fluorescence—a process by which radiant flux of certain wavelengths is absorbed and reradiated nonthermally at other, usually longer, wavelengths.
- 3.1.3 infrared (IR)-referring to radiant flux having wavelengths longer than the wavelengths of light, usually wavelengths from about 760 mm to about 3 mm.
- 3.1.4 light—electromagnetic radiant energy that is visually detectable by the normal human observer, radiant energy having wavelengths from about 380 nm to about 780 nm.
- 3.1.5 huminescence—the emission of radiant energy during a transition from an excited electronic state of an atom, molecule or ion to a lower electronic state.
- 3.1.6 metamers—specimens differing in spectral reflectance

<sup>&</sup>lt;sup>4</sup> This guide is under the jurisdiction of ASTM Committee E30 on Forensis Sciences and is the direct responsibility of Subcommittee B30.02 on Questioned

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Available from U.S. Department of Commorce, National Bureau of Standard Reference Materials, R. B311, Chemistry Building, Guithersburg, MD 20899.

### **⊕** E 1422

but having colors that match in light of one spectral composition, when viewed by one observer, but may not match in light of other spectral compositions, or when viewed by another observer. (E 284)

- 3.1.7 spectroscopy—in the most general sense spectroscopy is the study of the absorption or emission of electromagnetic energy by a chemical species as a function of the energy incident upon that species.
- 3.1.8 source—an object that produces light or other radiant flux. (E 284)
- 3.1.9 ultraviolet (UV)—referring to radiant flux having wavelengths shorter than the wavelengths of light, usually wavelengths from about 10 nm to 380 nm.
- 3.1.9.1 Discussion—Long-wave UV usually refers to the spectral range of UV-A, with wavelengths from about 315 nm to 380 nm. Short wave UV usually refers to the spectral range of UV-C, with wavelengths from about 100 nm to 280 nm.
- 3.2 Definitions of Terms Specific to This Standard:
- 3.2.1 ballpoint pen ink—writing or marking media intended for use in a ball point pen. Typically, a thick, high viscosity ink with an oil, glycol or rubber base.
- 3.2.2 dichroic filter—a filter with two transmission bands. These bands are usually widely separated, and can be of significantly different size.
- 3.2.3 gel pen ink—writing or marking media intended for use in a "gel-type" roller pen. Gel pen inks constitute a unique class of non-ballpoint pen inks. Typically, gel pen ink is an aqueous ink of high viscosity, capable of maintaining a stable dispersed or dissolved state of the coloring material even after a prolonged period and exhibiting high fluidity under a shearing force. The ink contains a coloring material (pigment or dyes), acid-modified heteropolysacharide and aqueous medium (water and water-soluble organic solvent), in which water constitutes at least 50 % by weight. Due to the incorporation of pigments into these formulations, the procedures outlined in this guide for TLC evaluations will be of limited value.
- 3.2.4 infrared luminescence (IRL)—the emission of radiant energy during a transition from an excited electronic state of an atom, molecule or ion to a lower electronic state (fluorescence or phosphorescence, or both), where the spectrum of the excitation source is in the ultraviolet (UV) or visible region of the electromagnetic spectrum, or both, and the spectrum of the emitted energy is in the far red or infrared (IR) region of the electromagnetic spectrum.
- 3.2.5 tak formula—a precise recipe or set of ingredients and their quantities that the manufacturer specifies for the final ink product. These ingredients are colorants (dyes and pigments) and vehicle components (volatile solvents, resins, etc.).
- 3.2.6 match between ink samples—the inability to distinguish between ink samples at a given level of analysis.
- 3.2.7 non-ballpoint pen ink—writing or marking media intended for use in a writing or marking instrument other than a ballpoint pen, including a dip or fountain pen, porous point pen, roller pen, marking instrument, etc. Typically, a thin, low viscosity ink with a water or solvent base.

### 4. Significance and Use

4.1 Ink comparisons are usually performed to answer four

basic categories of question: (1) whether an ink is the same (in formula) as that on other parts of the same document or on other documents; (2) whether two writings with similar ink have a common origin, that is, the same writing instrument or ink well; (3) whether the ink of entries dated over a period of time is consistent with that dating or indicates preparation at one time; (4) whether ink is as old as it purports to be (1).

- 4.2 The procedures set forth in this guide are directly applicable to giving a full answer to only the first of these four questions.
- 4.3 With regard to the second question, differentiation of formula (question one) would indicate a negative answer to this question, as would differentiation with any of the additional methods listed in Section 3. When dealing with contemporary inks, however, a match of ink samples involving agreement in all observable aspects of all the techniques considered in this guide, while consistent with common origin, would not be sufficient to support a definite opinion of common origin (2). Contemporary ink rarely has sufficient individuality to support a determination of common origin at less than the manufacturing batch level.

Note 1—Contemporary mass-produced inks are usually distributed as a component in a complete writing instrument or in a cartridge. With such packaging the ink is not subject to the mixing of inks and exposure to environmental contamination that could individualize ink from a given ink well at a specific point in time (1, 3). This sort of analysis, potentially useful in the examination of older documents or those prepared under certain circumstances, is beyond the scope of this guide, as is examination of the ink line to individualize the writing instrument that produced it based on its performance characteristics.

- 4.4 As to the third and fourth questions involving the age of ink, dating techniques for determining either the relative age of ink samples (from the same or different documents) or the absolute amount of time since the writing of an ink line are also beyond the scope of this guide.
- 4.5 However, regarding question three, it may be of great importance in a forensic situation involving writing dated over a period of time to determine that one or more than one ink formula is present, that the use of various ink formulas fits a pattern, that a particular ink formula matches samples of a known date, etc.
- 4.6 As to the last question, a limit as to the possible age of an ink entry can be inferred by establishing the date of first production of the ink formula. Although beyond the scope of this guide, identifying ink formulas as to their manufacturer or time of manufacture utilizes many of the analytical procedures described here. Specialized knowledge and experience on the part of the examiner, as well as access to a collection or library of ink reference samples is also required.
- 4.6.1 Such an ink library consists of samples of ink formulas from known sources, usually manufacturers of ink, or writing or marking instruments, or a combination thereof. The ink reference samples are usually cataloged, analyzed, and stored according to the methods described in Refs (2, 4, 5 and 6). Even with access to a comprehensive collection, association of an unknown ink sample with a single known formula is not

<sup>&</sup>lt;sup>a</sup> The boldface numbers in parenthesis refer to the list of references at the end of this guide.

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always possible. This is because some ink formulas are not distinguishable, however, in most cases the analytical procedures outlined here are sufficiently discriminating that formulas are distinguishable.

- 4.7 Comparison of ink samples by analysts without an ink library can still provide valuable information. However, added significance can be given to the meaning of a match if the relative rarity or commonness of the ink formula is known. Familiarity with or access to a comprehensive reference collection of inks is useful for this purpose.
- 4.8 In expressing conclusions it should be remembered that a match indicates that the ink samples are of the same formula or of two similar formulas with the same nonvolatile components. The possibility that other analytical techniques might be able to differentiate them should always be considered (2).
- 4.8.1 Therefore, conclusions in this situation should never indicate that two ink samples are "identical" or "the same ink," but must be limited to statements indicating "inability to distinguish the ink samples at this level of analysis" or "exhaustive chemical and physical testing failed to detect any differences between the ink samples" (2).

#### 5. Interferences

- 5.1 Most interferences with ink examinations come from variables that interact with the ink. These can be part of the writing process, such as blotting wet ink (1, 2), or variations in the paper (7), or various forms of contamination on the document (7, 8), or a combination thereof. Simple precautions can usually avoid problems.
- 5.2 Note and record any differences in the substrate, such as the use of different paper for different documents or pages of a multipage document. Also note and record variations in the document, such as a signature written over a photograph on an identity document, multicolored paper with different dyes or colors of underprinting, intersections with printed or typed material, etc. (7, 8).
- 5.3 The results of prior handling or testing should also be noted and recorded. These effects can include discoloration or fading from ageing, exposure to light or heat, as well as stains from food or drink, dirt or grease, cellophane or other tape, adhesives, perspiration or finger smudges, water, or chemicals, including ninhydrin or other reagents for visualizing latent friction ridge impressions, etc. (7, 8, 9).
- 5.4 In optical examinations care should be taken to consider the potential effects of these variables (7, 8). In chemical analyses paper blanks should be run as controls for these variables (4, 5).

### 6. Reagents and Equipment

Nore 2-It is important that all reagents are uncontaminated.

- 6.1 Purity of Reagents-Reagent Grade.
- 6.2 Purity of Water-Distilled or equivalent.
- 6.3 Reagents for Spot Testing, Solubility Testing, and TLC Extraction Solvents:
  - 6.3.1 Pyridine.
  - 6.3.2 Ethanol.
  - 6.3.3 Water.
  - 6.3.4 Other reagents as required by Refs (1, 3, and23).

- 6.4 Reagents for Thin Layer Chromatography (TLC) Developing Solvents:
- 6.4.1 Solvent System I—Ethyl acetate, ethanol, water (70+35+30).
- 6.4.2 Solvent System II—N-butanol, ethanol, water (50 + 10 + 15).
- 6.5 Other ink extracting solvents and developing solvents in accordance with Refs (5, 6, and 10).
  - 6.6 Equipment for Optical Examinations:
  - 6.6.1 Stereomicroscope:

Note 3—Five to one hundred power total magnification is a range that has been found useful.

- 6.6.2 UV Lamps or View Box, with both long-wave UV and short-wave UV lamps.
- 6.6.3 Colored Filters, (gelatin, colored glass, interference filters) as needed for visual and photographic differentiation of inks.
  - 6.6.4 Dichroic Filters, See Ref (11).
- 6.6.5 Photographic or other imaging equipment with appropriate film or other sensor, lighting, and filters for differentiation of ink samples.
- 6.6.6 Photographic or other imaging equipment with appropriate film or other sensor, lighting, and filters for recording reflected infrared (RIR) and infrared luminescence (IRL).
- 6.6.7 IR image conversion device or system with appropriate light sources and filters for use in RIR and IRL modes as well as appropriate photographic or other imaging equipment, computer hardware and software for image acquisition or processing, or both.
- 6.6.8 Barrier Filters for RIR and IRL—Long pass filters, preferably sharp cut, that block visible flux. Suitable gelatin, colored glass, and interference filters are commercially available (12, 13, 14).

Note 4—Since ink reactions can vary, it is advisable to use a series of filters with cut on wavelengths from the red through the IR range of the film or detector.

6.6.9 Excitation Source for IRL—Sources include: a continuous spectrum lamp with a filter to eliminate flux in the IR and far red region of the spectrum, for example, a 10 % to 15 % solution of copper sulfate in a cell with a 1 cm to 3 cm light path, or appropriate colored glass or interference filters; or lasers or other monochromatic sources.

Note 5—A variety of sources with different spectral distributions or a variety of filters on a continuous spectrum source may be helpful in discriminating ink samples.

When using a filtered source it is advisable to use a heat absorbing filter between the source and the filter. This both protects the filter (15) and eliminates a significant portion of the undesirable IR flux.

- 6.6.10 Photographic or other imaging equipment for recording observations as required.
- 6.7 Equipment for Spot Testing, Solubility Testing, and TLC—It is important that all equipment is uncontaminated.
- 6.7.1 Stereomicroscope (See Note 2).
- 6.7.2 Hypodermic Needle, with an approximately 20 gage hollow boring point or blunted point, scalpel or similar sampling device.
- 6.7.3 Disposable Vial or Transparent Sample Container—1 dram or smaller suggested.

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- 6.7.4 Disposable Micropipettes-10 µL or smaller suggested.
- 6.7.5 Precoated Plastic or Glass Sheets/Plates of Silica Gel, without fluorescent indicator (60 Å pore size<sup>7</sup>).

Note 6-It is recommended that the TLC sheets/plates be kept in a

- 6.7.6 Glass Developing Tank with Air Tight Cover-This tank should be the appropriate size for the sheet/plate being developed.
- 6.7.7 UV Lamps or View Box, with both long-wave UV and short-wave UV lamps.
- 6.8 Appropriate equipment for the optional techniques listed in Section 3.

#### 7. Procedure

### NONDESTRUCTIVE OPTICAL EXAMINATIONS

- 7.1 Light Examination:
- 7.1.1 Determine the Class of Ink-Under ambient lighting conditions (natural or artificial), with or without the aid of magnification as required, determine whether the class of the ink is ballpoint pen or non-ballpoint pen (6). Observe the overall appearance of the writing. Note and record anything that might provide information about the kind of writing or marking instrument used. For example, if there is an indentation down a central track then the writing instrument may be a ballpoint pen or rolling ball marker. Double indentations may indicate a bifurcated nib dip pen or fountain pen. This step may be performed with the use of reference standards prepared with various classes of writing instruments on different substrata.
- 7.1.2 Determine the Condition of the Ink and the Overall Appearance of the Writing-Note and record the presence of anything that might have induced a change in the ink as described in Section 2; for example, stains, burns, aging, blotting, fading, attempts at mechanical erasure or chemical eradication, discolorations, etc.
- 7.1.3 Determine the Color of the Ink-Inks that are metamers can sometimes be differentiated by the use of illuminants with varying color temperatures or spectral characteristics, as well as by narrow band or laser illumination. Various filters can also be used for direct viewing, photography, or electronic viewing, including wide and narrow band, short and long pass, and dichroic filters (1, 6, 11, 16).

Note 7-The use of standard color notation may be helpful in recording these observations. (NBS Standard Sample No. 2106, NBS Special Pub. 440)

- 7.1.4 Microspectrophotometry (17) can be useful in differentiating inks by measuring their wavelengths of maximum transmission or reflectance spectra, or both.
- 7.2 Ultraviolet (UV) Examination:
- 7.2.1 Observe the ink sample under both long-wave UV and short-wave UV sources. Note and record the fluorescence characteristics of the ink as well as the emission of any fluorescence (18). (See Note 7.)

Note 8-Except for some red formulas, few inks fluoresce in their dried state on paper. A fluorescent halo is occasionally observed around an ink line; capillary migration of a vehicle component into the substrate is a known cause.

- 7.2.2 Note and record any effect of the substrate. Strong fluorescence of the paper may affect the observer's perception
- 7.2.3 UV examination may reveal indications that the document has been stained by chemicals or other material that may affect the ink comparison as discussed in Section 5 (7, 8, 9). These can include the detection of the use of chemical ink eradicators, liquid or dry opaquing material, cellophane or other tape, adhesives, etc., that may have significance beyond the ink comparison. These should be noted and recorded.
  - 7.3 Infrared (IR) Examination:
- 7.3.1 Determine the Reflected Infrared (RIR) and Infrared Luminescence (IRL) characteristics of the ink: As these effects are beyond the range of human vision, some technological extension of the eye is required.
- 7.3.1.1 These characteristics may be photographed with IR sensitive film or observed directly with an IR image conversion device (7, 8, 11, 15, 16, 19, 20, 21). With either system, a suitable barrier filter is required in front of the lens to block visible flux (see 6.6.8 and Note 4). For IRL a suitable excitation source will also be required (see 6.6.9 and Note 5).

Note 9-Both photographic and electronic systems work well; each has its advantages and drawbacks.

Photography provides a permanent, high resolution record of results and long exposures can capture faint luminescence. However, exposures can be long (up to 20 min. for faint luminescence), and considerable experience is required before dispensing with time consuming bracketing in a series of exposures using different filters (19, 28). The amount of time required for processing and printing may also be a problem.

Electronic systems, including units with image conversion tubes and closed circuit television systems, have the advantage of real time results, facilitating optimization of filter combinations, focus, exposure, etc. (21). These systems are well suited to acreening batches of documents (such as passports) for alterations. However, resolution is limited, some faint luminescence may not be easy to detect, and separate photographic or electronic imaging equipment is required to record results. Modern integrating infrared video cameras are able to detect faint IR information that cannot be seen otherwise.

### 7.3.2 Reflected Infrared (RIR):

7.3.2.1 Record the characteristics as opaque or transparent. indicating the degree of opacity. The more opaque the ink (the more it absorbs), the darker it will appear; the less opaque, the lighter it will appear, until it seems to be transparent or to drop out. An arbitrary four point scale of -3 to 0 (opaque to transparent) may assist in recording these observations.

7.3.3 Infrared Luminescence (IRL):

7.3.3.1 Record the IRL characteristics of the ink relative to the substrate as darker, similar, or lighter, indicating degree as appropriate. Ink that luminesces more brightly than the substrate will appear lighter than the substrate, strongly luminescent ink may appear to glow brightly. If ink does not luminesce or does not luminesce as brightly as the substrate, the ink will appear darker than the substrate (this is sometimes referred to as black luminescence or negative luminescence). Ink that luminesces at an intensity similar to that of the substrate appears invisible, and is said to drop out. An arbitrary seven

<sup>&</sup>lt;sup>7</sup> Merck Silica Gel, Whatman PE Sil. G. and Merck HPTLC Silica Gel 60 have en found satisfactory.

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point scale of -3 to 0 to +3 (black to indistinguishable to very bright) may assist in recording these observations.

Nove 10—Depending on the characteristics of the substrate and the combination of source or filters, or both, the appearance of ink samples with the same formula can vary from nonluminescing to strongly luminescent. The appearance of ink luminescence can be affected by the amount of ink and the substrate.

7.3.3.2 A luminescent halo is occasionally observed around an ink line; capillary migration of a vehicle component into the substrate is a known cause.

7.3.3.3 Inks that luminesce with similar but not identical intensity can sometimes be differentiated by placing a nonluminescing or brightly luminescing object behind the substrate (22).

7.4 When recording UV fluorescence, IR absorption, and IRL characteristics of an ink sample, it is important to note and record any influence imparted by the substrate. It is also important to be aware of factors (such as those discussed in Section 2) that may affect the results of this portion of the examination (7, 8, 9).

7.5 The reaction of an ink sample can vary at different wavelengths. Therefore, in differentiation of ink samples it is useful to use a range of different light sources, filters, filter combinations, etc. (16) (See Note 4 and Note 5). In noting and recording the reaction of the ink sample, also record the source, filters, etc.

#### CHEMICAL EXAMINATIONS

7.6 Spot Testing and Solubility Testing:

7.6.1 Spot testing of an ink sample can be done directly on the substrate. Minimal damage to the document is possible if the solvents are applied in small amounts to the ink line and the resulting changes are observed under magnification. Spot testing of an ink sample can be done on a removed sample, if performing the test in situ is not indicated. These tests can be used to differentiate ballpoint and non-ballpoint ink based on the solvent that solubilizes the vehicle, to determine the proper extraction solvent for subsequent analysis, or to provide presumptive information on the colorants used in the ink formula.

Note 11—These tests may consume a great deal of material relative to the amount of information provided.

7.6.2 Spot tests to determine the solubility or color reaction of an ink sample to various reagents were once widely used to differentiate ink formulas and to presumptively identify the constituents of an ink formula. Information on older ink formula can be found in Osborn (1) and Mitchell (3). A study of more modern blue ballpoint inks has been conducted, and an analytical scheme published (23).

7.6.3 At present spot tests are most often used to differentiate ballpoint and non-ballpoint ink based on the solvent that solubilizes the vehicle. Ballpoint inks are either oil based or glycol based. Oil based ballpoint inks were used in the earliest ballpoint pens. Generally, glycol based ballpoint inks (widely used since around 1950) are very soluble in pyridine. Inks formulated for fountain pens, porous point pens, and roller pens are generally water or alcohol based and compositions that are readily soluble in ethanol and water (1+1) (2).

Indelible markers are solvent based and would generally be soluble in pyridine. Note and record the results. If TLC is planned, these results can be used for selecting the appropriate extracting solvent.

7.6.4 These tests, performed in situ or on a removed sample with various solvents, can be sufficient to determine that two or more ink samples are not of the same ink formula. In many situations, once such a determination is made, further testing may be unnecessary.

7.7 Chromatography—Thin Layer Chromatography (TLC)—Many forms of chromatography have been used successfully to differentiate writing inks, including paper chromatography, high pressure liquid chromatography (HPLC), gas chromatography (GC), and thin layer chromatography (TLC). Except for substrate specific items, the procedure for paper chromatography is similar to TLC (2, 5).

7.7.1 TLC Sheet/Plate Activation—Activate a TLC sheet/ plate in a pre-heated oven (approximately 100°C for 10 to 15 minutes) immediately prior to spotting. Allow sheet/plate to cool.

Now 12—Heating the sheet/plate merely drives off plate moisture. If the sheet/plate were stored under ideal desiceate conditions, activation would theoretically be unnecessary; however, it would still be advisable to heat the sheet/plate as a precaution.

7.7.2 Sampling for TLC:

7.7.2.1 Using a blunted or hollow boring hypodermic needle, or similar device, remove a sufficient number of plugs (usually 7 to 10 plugs of ink from a line are sufficient). If a scalpel is used, remove about 1 cm of the line. The number of plugs (or length of line) required depends on the concentration and solubility of the ink.

7.7.2.2 Avoid sampling areas on a document that may be contaminated by writing on the reverse, or by stains or other contaminants on either side. (See Section 2)

7.7.2.3 Place the plugs of ink in a vial.

7.7.2.4 Place the same number of plugs of paper (or the same size piece of paper) from a control area of the substrate in another vial.

7.7.2.5 If the writing is limited, microsampling techniques using a single plug may be necessary (24).

7.7.3 Extracting the Ink.

7.7.3.1 Add approximately 3 to 5  $\mu$ L of solvent (pyridine for ballpoint inks or ethanol and water (1+1) for non-ballpoint inks) to the vials. (Other solvents may be used based on the ease of extraction. The comparison standard inks must have been extracted using the same solvent.) The amount may vary depending on the absorptivity of the substrate and the type and age of the ink line. Adjust the amount of extracting solvent as needed. If both ballpoint and non-ballpoint ink from the same sheet of paper (or other substrate) are being analyzed, two paper control samples will be necessary since the ink extractions will require two solvents and each solvent may extract different components from the substrate.

7.7.3.2 Gently agitate the plugs and solvent for approximately I min or until sufficient extraction has occurred. Note and record the color of extract in the vial. The use of standard color notation may be helpful in recording these observations.

(Test Method D 1535, NBS Standard Sample No. 2106, NBS Special Pub. 440)

7.7.4 Spotting the Ink:

7.7.4.1 Spot the extract on the activated TLC sheet/plate approximately 15 mm from the designated bottom of the plate. It is important to maintain uniformity in the intensity and size of the spot (a spot size of approximately 2 to 3 mm works well). Spots should be placed no closer than 1 cm from either the left or right side of the plate and should be adequately separated so they will not interfere with each other during the migration of the components of the sample. The boundaries (left and right) of each area to be spotted may be scribed with a stylus or pencil. Do not place these boundary marks closer than 1 to 2 mm from the area of the plate to be spotted. This is so there will be no interference for the solvent system traveling up the plate. If a pencil is used, do not spot the extract directly on the pencil mark or in the same lane since many inks contain carbon or graphite, as do pencils.

7.7.4.2 Numerous ink samples can be analyzed simultaneously by spotting each ink sample and paper blank on the same chromatographic sheet/plate with sufficient separation to avoid interference or cross contamination, or both. These spots should be equal in intensity and size. This is attainable through manipulation of the number of ink plugs (or length of ink line) and the amount of extracting solvent. If the maximum number of samples are to be compared on a sheet/plate, do not spot the extract closer than 1 cm from either side of the plate can cause a skewed separation that may affect the comparative value of the chromatogram.

7.7.4.3 Allow the sheet/plate to air dry to remove any residual solvent. The amount of time will vary depending on the laboratory conditions and the solvent(s) utilized. Do not expose the sheet/plate to extreme heat or light during the spotting procedure. This has been shown to induce changes in the resultant chromatograms of some ink formulas (5, 9).

7.7.4.4 If the intensity of the spot is weak, it may be necessary to respot. This is done by carefully applying additional extract directly over the original spot and air drying again.

Nore 13—This technique requires experience. It is important to keep the spot size consistent when respotting (for example, do not spot a 1 mm spot over as existing 2 mm spot). Otherwise you may create rings that can skew the appearance of the resulting separation. Respotting can be accomplished through the careful adjustment of the amount of extract to be spotted.

7.7.4.5 Use of a suitable calibration standard is recommended. It should be spotted onto the plate in the same manner.

7.7.5 Developing the TLC Sheet/Plate:

7.7.5.1 Place the sheet/plate in a developing tank previously equilibrated for approximately 15 min with Solvent System I. The level of solvent in the tank should be between 5 and 10 mm and should not touch the ink extraction spots when initially submerged. Let the chromatogram develop until the components exhibit sufficient separation to allow comparison or for approximately 15 min.

7.7.6 Evaluating:

7.7.6.1 Remove the chromatogram from the developing

tank and immediately evaluate the fluorescent characteristics using long-wave UV and short-wave UV sources. Note and record the color, the fluorescent characteristics, the retardation factor (R value), and the relative concentration of all fluorescent bands present for each ink sample.

7.7.6.2 Follow the same procedure for the corresponding paper (or other substrate) control (blank), to determine if there is any contribution from the substrate, for example, from tinting materials or optical brighteners (5).

7.7.6.3 Allow the sheet/plate to air dry and promptly evaluate it again following the same procedures. Note and record any change.

Note 14—The appearance of certain fluorescent components can change in the time between these two observations.

7.7.6.4 Under ambient light note and record the color, the Rf value, and the relative concentration of all bands present for each ink sample and control.

7.7.6.5 The completed plate should be stored away from light, heat, and air, since, in their separated form, ink dyes are very susceptible to fading or change of color. Results may be preserved by color photography.

7.7.7 Interpretation:

7.7.7.1 Samples of ink with qualitatively different colorant compositions can be easily distinguished by comparison of the characteristics observed in 7.7.6.

#### 8. Additional Methods

- 8.1 If more information is needed to distinguish similar inks, some of the following techniques may be tried.
- 8.1.1 Additional Thin Layer Chromatography (TLC) Techniques:
- 8.1.2 Solvent System II allows development in a solvent system of a different polarity that may affect a different separation of the components (2, 4).
- 8.1.3 It may be advisable to use a different TLC sheet/plate along with the additional solvent systems. This may give a different separation and allow another means of comparison (2, 4, 10).
- 8.1.4 The chromatograms can be evaluated with the aid of laser or other monochromatic illumination, RIR and IRL, or other techniques described in 7.1.3.
- 8.1.5 The chromatograms can be scanned on a spectrophotometer equipped for scanning TLC sheets/plates (TLC densitometer). This gives an accurate quantitative comparison of the relative concentrations of components (5).

8.2 Other Analytical Techniques:

- 8.2.1 These techniques may provide valuable information concerning components found in inks, including solvents, surfactants, humectants, and resins. They may be of use in certain situations, but are not generally necessary in performing routine ink comparisons.
- 8.2.2 Fourier Transform Infrared Spectroscopy (FTIR) can be useful when detailed information is necessary about an ink's organic composition (4, 25).
- 8.2.3 Gas Chromatography (GC), Gas Chromatography/
  Mass Spectrometry (GC/MS) can provide information on
  organic components (4). GC/MS operating in the selected ion
  monitoring mode permits reliable detection and identification

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of the ink's primary vehicle solvents (28).

- 8.2.4 High Pressure Liquid Chromatography (HPLC) has been used to gather information on batch-to-batch variation or when detailed information is necessary about an ink's organic composition (26).
- 8.2.5 Microspectrophotometry can be used to obtain the ink's spectral transmittance curve or reflectance curve, or both
- 8.2.6 Spectrofluorometry has been used when an emission spectra is desired (27).
- 8.2.7 X-Ray Fluorescence Spectroscopy can provide detailed information on the inorganic components of an ink (5).
- 8.2.8 Capillary Electrophoresis has been used to provide detailed organic comparisons of two or more inks (29).

#### 9. Reporting Conclusions

- 9.1 Conclusions resulting from the comparison of two ink samples may be reached once sufficient examinations have been conducted. In reporting conclusions, the tests performed shall be listed. The number of necessary tests is dependent on the inks involved.
  - 9.2 Differentiation:
- 9.2.1 If significant, reproducible, inexplicable differences between ink samples are found at any level of the optical or chemical analyses, it may be concluded that the inks do not have a common origin.
- 9.2.2 However, when inks give differing test results, the possibility of batch-to-batch variation must be considered.

HPLC or FTIR may detect batch-to-batch variation. The potential influences of interfering factors that can alter the composition of an ink sample must also be considered (see Section 2).

#### 9.3 Matches:

- 9.3.1 When the comparison of two or more ink samples by optical or chemical analyses, or both reveals no significant, reproducible, inexplicable differences and there is significant agreement in all observable aspects of the results, it may be concluded that the ink samples match at that level of analysis and that the results of the examination indicate that the ink samples are of the same formula or of two similar formulas with the same nonvolatile components (2). The possibility that other analytical techniques might be able to differentiate the samples should be considered.
- 9.3.2 This conclusion does not eliminate the possibility that the ink samples being compared are from different manufacturing batches or from different writing or marking instruments
- 9.3.3 Reports of conclusions should never state that two ink samples are identical or the same ink. Statements must be within the limits of 9.3.1.

#### 10. Keywords

10.1 forensic sciences; ink comparison; questioned documents

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# EXHIBIT 19



Designation: E 1789 - 04

#### Standard Guide for Writing Ink Identification<sup>1</sup>

This standard is issued under the fixed designation E 1789; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last responsal. A superscript epsilon (a) indicates an editorial change since the last revision or reapproval.

#### INTRODUCTION

This guide is intended as a general outline for use in forensic ink examinations, where the intention is to identify an ink formula or type. It is designed both for the experienced document examiner (see Guide E 444) and for those unfamiliar with previously reported procedures. The aim is to describe those techniques that will provide the most information about an ink with the least damage to the document. This guide refers to well-reported and thoroughly tested techniques currently in use by forensic document examiners, chemists, and other scientists.

Following the procedures as outlined, an examiner can accurately discriminate between ink formulas; as well as significantly reducing the possibility of reporting false matches of ink samples from different sources or incorrectly differentiating ink samples from a common source.

Identifications of ink formulas may be accomplished through the use of an adequate collection of standards. The necessary completeness of a comparison collection and limitations of conclusions will be addressed in the guide.

#### 1. Scope

1.1 This guide covers assisting forensic examiners in identifying writing inks. Included in this analysis scheme are the necessary tools and techniques which have been successfully utilized to reach conclusions as to the common or different origin of two samples of ink.

1.2 This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

#### 2. Referenced Documents

2.1 ASTM Standards: 2

E 444 Guide to Descriptions of Scopes of Work Relating to Forensic Sciences for Questioned Document Area

E 1422 Guide for Test Methods for Forensic Writing Ink Comparison

2.2 NIST Standards:

NBS Standard Sample No. 2106 ISCC-NBS Centroid Color

NBS Special Pub. 440 Color: Universal Language and Dictionary of Names<sup>3</sup>

#### 3. Terminology

3.1 Definitions-Terminology has been defined in Guide E 1422, with the following addition:

3.1.1 ink library—an organized collection of reference samples of inks and related materials.

3.1.1.1 Discussion—For maximum effectiveness in identification of questioned ink, an ink library should at minimum include the following elements: reference samples of ink in unused form, either in bulk samples from the manufacturer or in distribution form such as bottles, pens, or cartridges; dried ink specimens of each reference sample of ink placed on paper (scribble sheets): analysis results of each reference sample of ink, for example, TLC sheets/plates; and an ink information file for each reference sample of ink containing available relevant data. All elements of the collection should be as complete, comprehensive, and up-to-date as possible, although this will vary between ink libraries.

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For referenced ASTM standards, visit the ASTM website, warw.astm.org. or contact ASTM Customer Service at service@astm.org. For Annual Book of ASTM industry volume information, refer to the standard's Document Summary page on the ASTM website.

Available from U.S. Department of Commerce, National Bureau of Standards, Office of Standard Reference Materials, R. B3 [1, Chemistry Building, Gaithersburg. MD 20899.

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#### 4. Significance and Use

- 4.1 The reasons for identifying writing inks are to obtain information about: the origin; relative availability; distribution; and first and last (if applicable) production dates. It is this valuable information available from the manufacturer and through the use of a collection of standards that differentiates this guide from Guide E 1422.
- 4.1.1 The procedure set forth in this guide are applicable in determining the significance of a match obtained by performing the examinations set out in Guide E 1422 (by showing how rare or common an ink formula may be), or in determining the source of an ink. The identification of a specific ink formula can facilitate the determination of the first date of production and the discontinuance date of that ink.4
- 4.1.2 In addition to proficiency in the use of the necessary analytical procedures, specialized knowledge and experience on the part of the examiner are required.<sup>5</sup> Also required is a comprehensive collection of reference samples of ink and related materials (ink library). The ink reference standards are cataloged, analyzed, and stored according to the procedures described in Section 7.
- 4.2 Even with access to a comprehensive ink library, it is not always possible to positively identify a questioned ink sample. This is because some ink formulations are very similar; usually only non-volatile ingredients such as dyes and pigments are compared; and no matter how comprehensive the ink library is, the collection will never be complete.6
- 4.2.1 Some ink formulas are not distinguishable; they behave in the same manner under various examinations because they have similar formulas with the same nonvolatile components. Thus, it is not always possible to find a single reference ink sample in the ink library that matches a questioned ink. Even if one is found, it may not provide an identification unless the ink formula is shown to be unique because it contains a specific component. For these reasons, it will not be possible to identify every questioned ink. There is not always a forensic answer to a question at hand.
- 4.2.2 It must also be understood that it is not possible to create an all inclusive ink library, just as it would not be possible to obtain every fingerprint, or every paint, soil, or glass sample. Conclusions as to the identity of an ink are dependent on the completeness of the ink library used. Thus, it is possible that there are one or more inks not in the ink library that would be indistinguishable from the questioned ink.
- 4.3 In spite of these limitations, questioned inks can be associated with reference ink samples with a high degree of confidence using the systematic approach in this guide. The analytical procedures given here, such as TLC and TLC Densitometry, are sufficient to distinguish most inks, and

therefore to match most questioned ink samples to a reference sample of ink or a relatively limited group of reference samples in an ink library.

4.3.1 Just as with other forensic tools, for example, FTIR, GC, HPLC, etc., pattern profile matching with reference samples is often sufficient to yield an identification. Individual component identification through an internal standard approach may be used, but is not usually necessary.4

#### 5. Interferences

- 5.1 Most interferences with ink examinations and subsequent identifications are a result of variables interacting with the ink. These variables can usually be attributed to the writing process or storage conditions, or a combination thereof, and are discussed in Guide E 1422. Evaluation of these variables can avoid problems examinations.
- 5.2 Other interferences can be caused by changes to the TLC diffusion of fluorescent components, differences in the paper controls, differences in color due to fading either of the inks or of the components on the TLC sheet/plate, solvent depletion, or a combination of these and other factors. Evaluation of these variables, use of paper blanks, and proper storage and maintenance of the reference samples and related material in the ink library can avoid problems in examinations.
- 5.3 Large batch-to-batch variations in the manufacturing process can also lead to problems in evaluating a match.

#### 6. Reagents and Equipment

- 6.1 Appropriate reagents and equipment for the required techniques have been listed in Guide E 1422, with the following additions:
- 6.1.1 Low Resolution Precoated Plastic or Glass Sheets/ Plates of Silica Gel, without fluorescent indicator (60) angstrom pore size).

Note 1-Low resolution sheets/plates are generally not as sensitive to external effects, for example, temperature, humidity, and development conditions. They have the quality of exhibiting excellent reproducibility and as such are an appropriate choice for storage media of the ink library TLC plates.

6.1.2 High Resolution Precouted Plastic or Glass Sheets/ Plates of Silica Gel, without fluorescent indicator (60 angstrom pore size).

Note 2-It is recommended that the TLC sheets/plates be kept in a desiccator.

#### Procedure

- 7.1 Collection, Preparation, and Analysis of Reference Materials for the Ink Library:
  - 7.1.1 Reference Samples of Ink:
- 7.1.1.1 The core of the ink library consists of reference samples of ink formulas, usually obtained from ink manufacturers. Additionally, ink and pens should be purchased at retailers on a regular basis (at least once a year), because it is not always possible to obtain samples directly from all manufacturers of ink. Because of international trade and travel patterns, reference samples of ink should be obtained on a world-wide basis.
- 7.1.1.2 Accession information for each reference sample of ink should be recorded, such as date of acquisition, source, etc.

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For an assembly of reference samples of ink to be considered a collection rather than an accumulation, it must be organized and caraloged. If a computerized database is used, searching can be on any criteria; if not, the features noted in a light examination performed in accordance with Guide E 1422 can be used to organize the collection.

- 7.1.1.3 Reference samples of ink should be stored under optimal laboratory conditions (sealed containers, darkness, temperature and humidity controlled) to retard drying, oxidation, and other changes related to aging.
  - 7.1.2 Dried Ink Specimens:
- 7.1.2.1 Prepare a specimen by making lines or marks on a sheet of paper (scribble sheet). Record the date of preparation. Allow the ink to dry for up to 1 h under ambient conditions before storing.
- Note 3—Dried ink specimens can be effectively stored on filter type paper that does not contain optical brightener additives. A sample of any paper being considered for a library storage media should be analyzed following the laboratory procedures as indicated in this standard. This will determine if the paper will interfere with the examination procedure.
- 7.1.2.2 Dried ink specimens should be stored under optimal laboratory conditions (darkness, temperature and humidity controlled) to retard fading and other changes.
- 7.1.3 Results of Analysis of Reference Samples—Because questioned ink samples will be analyzed in accordance with Guide E 1422 for comparison with the ink library (see 7.2), the reference samples in the library should undergo the same analyses with results preserved for future searching.
- 7.1.3.1 Perform the light, ultraviolet (UV), and infrared (IR) examinations in accordance with Guide E 1422.
- 7.1.3.2 Perform the spot testing and solubility testing in accordance with Guide E 1422.
- 7.1.3.3 Perform the thin layer chromatography TLC examination in accordance with Guide E 1422.
- 7.1.3.3.1 Note and record the extraction solvent used. Where appropriate, prepare duplicate extractions using all the different solvents likely to be employed in extraction from various substrata. Prepare a TLC of each extract, recording the solvent used. Appropriate TLC sheets/plates will then be available for comparison with questioned samples.
- 7.1.3.3.2 The TLC analysis should be conducted on low resolution type sheets/plates. Low resolution sheets/plates are generally not as sensitive to external effects, for example, temperature, humidity, or development conditions. They have the quality of exhibiting excellent reproducibility and as such are an appropriate choice for storage media of the ink library TLC sheets/plates.
- Non: 4—Plastic backed 60 angstrom size silica gel without fluorescent indicator sheets/plates has been found to be satisfactory.
- 7.1.3.3.3 Ink library TLC sheets/plates should be stored under optimal laboratory conditions (darkness, temperature and humidity controlled) to extend the useful life of the sheets/plates. TLC sheets/plates have a limited useful life; the sheets/plates themselves will degrade after 10 to 20 years, and the band colors and fluorescence characteristics may fade or undergo other changes sooner. Deteriorating TLC sheets/plates should be replaced as needed.
  - 7.1.4 Ink Information Files:

- 7.1.4.1 All available relevant data on each reference ink sample should be collected and maintained. This can include information on the manufacturer; ink formula; manufacturer's designation(s) and marketing name(s); other user's (for example, pen manufacturers) and their designation(s) and marketing name(s); volume of ink manufactured; area(s) of distribution; first production date; date first released to the public; last production date; etc.
- Note 5—Some information may be considered proprietary by the ink manufacturer or other source. Such information should be treated with the appropriate confidentiality.
- 7.1.4.2 Analytical results and other data from 7.1.3 should be maintained. Efficient organization of this information can facilitate searches of the ink library.
- 7.2 Ink Identification—Ink identification is a two step process. The first step involves comparative analysis techniques described in Guide E 1422. The second step includes comparison of any resulting TLC plate from the initial analysis to an ink library.
- 7.2.1 Perform the light, ultraviolet (UV), and infrared (IR) examinations and record results in accordance with Guide E 1422.
- 7.2.2 Perform the spot testing and solubility testing and record results in accordance with Guide E 1422.
- 7.2.3 Perform the thin layer chromatography TLC examination in accordance with Guide E 1422.
- 7.2.3.1 The comparison reference inks in the ink library must have been extracted using the same solvent. If there is no TLC plate in the ink library that meets this requirement, prepare one in accordance with Guide E 1422 using the appropriate solvent before proceeding.
  - 7.2.4 First TLC Interpretation:
- 7.2.4.1 Samples of ink with qualitatively different colorant compositions can be easily distinguished by comparison of the characteristics described in Guide E 1422.
  - 7.2.5 Comparison Against a Library of Standards:
- 7.2.5.1 Where comparison against a library of standards is desired, the initial TLC analysis should be conducted on low resolution type sheets/plates of the same type used to prepare the TLC sheets/plates in the ink library.
- 7.2.5.2 Using the results of the light, ultraviolet (UV), and infrared (IR) examinations (see 7.2.1) search the library for samples known to produce these results. Physically compare the questioned ink sample in situ with the dried ink samples from the ink library. Note and record all ink library reference samples that are consistent with the questioned ink at this stage.
- 7.2.5.3 Physically compare the chromatogram of the questioned ink with the chromatograms of all the reference samples in the ink library that were not eliminated in 7.2.5.2. Observe the band colors, Rf separations, and fluorescence characteristics. Note and record all ink library reference samples that are consistent with the questioned ink at this stage.
- 7.2.5.4 Those reference samples that match at every level of the examination are selected as possible matches in preparation for the second TLC comparative examination.

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7.2.5.4.1 Reference samples from the ink library having explicable differences should also be selected as possible matches. Such over-selection of standard inks reduces the possibility that a true match is not eliminated from consideration. Explicable differences include characteristics arising from diffusion of fluorescent components, differences in the paper controls, differences in color due to fading either of the inks or of the components on the TLC sheet/plate, solvent depletion, or a combination of these and other factors.

7.2.6 Second TLC Analysis:

7.2.6.1 Begin a second TLC comparison between the questioned ink and the potential matches from the ink library. This examination may further reduce the number of standard library inks that could match the questioned ink.

Non: 6—The TLC sheets/plates used at this stage should be very high resolution. TLC sheets/plates that are high resolution are generally very sensitive both to their surroundings and to development conditions. The reproducibility within a plate is extremely good; however, plates should not be inter-compared due to potential variations.

7.2.6.2 Remove a suitable amount of sample from each of the reference ink samples in the ink library whose physical and chemical TLC results are consistent with the questioned ink's. There may be many potential library matches at this stage of the examination. Every potential match should be sampled.

7.2.6.3 Perform a TLC analysis in accordance with Guide E 1422.

Non: 7—Glass backed 60 angstrom size silica gel without fluorescent indicator plates has been found to be satisfactory. Variations within plates of the same type and manufacturer have been noted.

NOTE 8—Spot all inks and the paper control samples (blanks) on the same plate. This is necessary based on the sensitivity of the high resolution TLC plates. If more than one plate is needed (one 20 by 20 cm plate can accept approximately 18 spots 2 to 3 mm wide) respot the questioned ink(s) and paper control(s) on each additional plate.

#### 7.2.7 Second TLC Interpretation:

7.2.7.1 Physically compare the chromatograms of the questioned and selected standard ink(s). Note and record the consistencies in band colors, Rf values, and any fluorescence characteristics. Also note and record any inconsistencies,

7.2.7.2 These comparative examinations between the questioned and standard inks provide the necessary information to climinate non-matching inks and to locate one or more matching reference ink samples in the ink library (if any matches are present).

#### 8. Additional Analyses

8.1 To date, most forensic analyses of writing inks involve thin layer chromatography. TLC provides a reproducible method that allows for storage of standards and for subsequent comparisons with unknowns. Sometimes, optical techniques along with TLC are insufficient to narrow the field of possible matches to a single reference sample in the ink library. The previously described analysis methods are not by any means the only techniques that can be used, nor are they represented to be the best of all possible methods. Each examination should be considered as an individual matter involving decisions regarding the best method(s) of analysis. The analyst must use the best analytical techniques available, be aware of advantages and shortcomings and determine as many identification

criteria as necessary. If more information is needed regarding a particular ink, the additional techniques listed in Guide E 1422 can be tried.

#### 9. Reporting Conclusions

9.1 In reporting conclusions of comparative examinations with an ink library, three necessary elements should be included: (1) a listing of the examinations performed; (2) the matches found; and (3) the conclusions drawn.

9.2 Examinations Performed—The report should include a listing of the laboratory examinations conducted. This section should discuss, but does not need to be limited to, the techniques found in Sections 7 and 8.

9.2.1 Examples—"Optical (physical) and chemical examinations were performed on the questioned ink from exhibit (give exhibit designation) and the results were compared with those from inks in our ink library. The examinations conducted include (list examinations performed)."

Note 9—If the exhibit bears several questioned inks, the report should state their location on the document and that the results of their individual examination were compared with each other. The report should identify questioned inks that are different from each other by sorting the questioned inks into distinct groups consisting of inks that match each other.

9.3 The Marching Standard Ink(s)—The cumulative set of comparative examinations (see Sections 7 and 8) will determine the number of reference ink samples (if any) that match a questioned ink. Depending on the level of analysis, a questioned ink can be said to match one or more reference samples in the ink library.

#### 9.3.1 Differentiation:

9.3.1.1 If significant, reproducible, inexplicable differences between the questioned ink sample and a reference sample are found at any level of the physical, or chemical analyses, or both, it may be concluded that the inks do not have a common origin.

9.3.1.2 However, when inks give differing test results, the possibility of batch-to-batch variation within an ink formula must be considered; this kind of slight variation may be detectable utilizing sophisticated instrumentation, generally limited to FTIR, GC/MS, HPLC and/or XRF. The potential influences of interfering factors that can alter the composition of an ink sample must also be considered (see Section 5).

9.3.2 Matches—When the comparison of the questioned ink sample and a reference sample by optical and chemical analyses reveal no significant, reproducible, inexplicable differences and there is significant agreement in all observable aspects of the results, it may be concluded that the ink samples match at that level of analysis and that the results of the examination indicate that the ink samples are of the same formula or of two similar formulas with the same components. The possibility that other analytical techniques might be able to differentiate the samples should be considered.

Nore 10—Each comparative examination has its own criteria for determining if a match exists. These are determined by the examiner, based on the examiner's training and experience. Matching criteria should not include inexplicable differences that are too vague (since this may unnecessarily increase the number of matching possibilities) or too specific (since this may eliminate an actual match).

Non: 11-When a comparative examination yields no inexplicable

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differences, the items compared may be said to match or to be indistinguishable at that level of analysis. These terms are not synonymous with the term similar, a term sometimes used for near matches where the results are close but do not meet all the necessary criteria.

- 9.3.3 An important concern when reaching a conclusion regarding ink matches is whether the matching inks are the same to the exclusion of all other inks. The possibility that the questioned ink matches an ink formula not in the ink library must be assessed based on the experience of the examiner, who evaluates the characteristics of the questioned ink, the examinations performed, the comprehensiveness of the ink library, and information from the ink manufacturer. Based on the above cited factors, this possibility can range from highly probable to extremely unlikely.
- 9.4 Single Library Match—The questioned ink matches only one reference ink sample in ink library to the exclusion of all other reference ink samples.
- 9.4.1 The matching reference ink sample must be the only one in the library that matches (see 9.3.2) when compared by each examination with the questioned ink sample.
- 9.4.2 Furthermore, it must be possible to differentiate (see 9.3.1) the questioned ink sample from each of the other (nonmatching) reference ink samples in the library by at least one comparison, thereby eliminating all other reference samples in the ink library as a possible match for the questioned ink.
- 9.4.3 In the absence of a unique component in the ink formula or some other reason to discount the possibility that the questioned ink may also match one or more additional inks not in the ink library, conclusions should not be reported in absolute terms as an identification, even though based on the comprehensiveness of the standard ink library, the level of examinations performed, and the characteristics determined, this possibility can be remote.
- 9.4.3.1 Examples—"These findings suggest that the questioned ink matches only one standard reference ink from the ink library." Alternatively, "these findings suggest that the matching standard ink is the only standard ink that could not be eliminated as being, the questioned ink." An equivalent statement can be substituted.
- 9.4.4 If it is determined that the questioned ink sample matches a reference sample that is unique, the report of the findings and of the conclusions should reflect this.
- 9.4.4.1 Examples—"The questioned ink was found to uniquely match a reference sample ink." The conclusion should also state that "The questioned ink is (identified as) the matching standard ink."
- 9.4.5 Depending on the information requested by the submitter, the report may include the ink manufacturer's name; the manufacturer's designation for the formula; the first production date and last production date; the area(s) of distribution; the brand and type of pens using the formula. If a first commercial production date of the questioned ink was requested, report that the questioned ink matches a reference sample in the ink

library that was first manufactured on (state first production date of the matching reference sample ink). Identification of specific dyes, components, and ratios should be avoided as this information may be considered proprietary to the manufacturer.

- 9.5 Multiple Library Match—The questioned ink matches a group of two or more reference ink samples in the ink library to the exclusion of all other reference ink samples outside the group.
- 9.5.1 The matching reference ink samples must be the only ones in the library that match (see 9.3.2) when compared by each examination with the questioned ink sample.
- 9.5.2 Furthermore, it must be possible to differentiate (see 9.3.1) the questioned ink sample from each of the other (nonmatching) reference ink samples in the library by at least one comparison, thereby eliminating all other reference samples as a possible match for the questioned ink.
- 9.5.3 Conclusions should be reported in a manner similar to a single library match (see 9.5.3), while reflecting the multiple matches found.
- 9.5.3.1 Example—"These findings suggest that the questioned ink is one of these matching standard inks or another ink with the same determined characteristics."
- 9.5.4 Reporting these findings may also include informational items regarding the inks (see 9.5.3). If a first commercial production date of the questioned ink was requested, then it is necessary to report the earliest first production date found within the group of matching reference samples. As noted above, no information should be reported that may be deemed proprietary to the manufacturer.
- 9.6 No Match—The questioned ink does not match any reference samples of ink in the ink library.
- 9.6.1 Inability to find a matching reference sample in the ink library could be due to one or more of several causes: The ink formula of the questioned ink sample exists outside of the library; but a reference sample of that ink formula is not in the ink library. A reference sample of the ink formula is in the ink library but does not match the questioned ink sample because of significant batch to batch variations in the manufacturing process. The questioned ink sample has changed to the point that it no longer will match a reference sample of the same ink formula in the library.
- 9.6.2 The report can list some of the possible reasons for these results.
- 9.6.2.1 Examples—"The questioned ink was not found to match any reference sample ink in the ink library. The questioned ink's appearance and characteristics may have changed (have been altered) due to storage conditions, contamination, etc. Another possibility is that the questioned ink may be one that is not in the ink library."

#### 10. Keywords

10.1 forensic sciences; ink identification; questioned documents

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# EXHIBIT 20

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# EXHIBIT 21

### Erich J. Speckin

#### Education:

- -Purdue University at age 15 to study engineering
- -Albion College at age 17 to study biology and pre-medical
- -Michigan State University graduated with a degree in Chemistry

#### Forensic Training:

- -Two year residency with Leonard A. Speckin in the examination of questioned documents
- -One year residency with Brunelle Forensic Laboratories in the identification and dating of inks

Over 10 scientific papers authored or co-authored including:

- -The Obverse-Reverse Intersection of Lines
- -Chemical Removal of Magic Marker on Photocopied Documents
- -An Independent Assessment of Ink Age determination by a Private Examiner
- -The Detection of Mastic on Plastic
- -Interpretation of Ink Age Testing Using Rate and Percent of Extraction
- -Case Study of Accelerated Ink Age Determination

Speckin Resume' Page 2

#### Invited Speaker:

- -Michigan State University
- -American Trial Lawyers Association
- -International Association of Questioned Document Examiners
- -Medical Legal Consultants
- -National Association of Document Examiners
- -Canadian Society of Forensic Sciences
- -American Academy of Forensic Sciences
- -American Society of Questioned Document Examiners
- -Midwestern Association of Forensic Scientists
- -Southwestern Association of Forensic Document Examiners
- -Medical Defense Attorneys Meetings
- -Wayne County Nursing Consultants
- -Various Insurance and Private Investigators Associations
- -Nevada State Bar Association
- -Gesellschaft für Forensische Schriftuntersuchung E.V. (GFS) in Hamburg, Germany

Testified in cases in Federal Court, Circuit Court, District Court, Union Arbitrations, licensing matters, depositions, and the State Board of Canvassers in Michigan, Pennsylvania, Delaware, Missouri, Georgia, Louisiana, North Carolina, Oregon, New York, Illinois, Indiana, Ohio, New Jersey, Oklahoma, California, Kansas, Washington D.C., Virginia, West Virginia, South Carolina, Florida, Arizona and Washington. Also in Vancouver, British Columbia Supreme Court, Mexico, and Hong Kong.

I have been appointed by judges in Michigan, California, Maine, Florida and Australia to perform examinations at the request of the court.

Speckin Resume' Page 3

I have also been retained by the Embassy of Uruguay, Florida Department of Law Enforcement, Michigan Attorney Generals Office, Department of Natural Resources, The State Board of Canvassers, Health Care Fraud Division, Federal Defenders Office, National Labor Relations Board as well as many local, county, state, and federal offices.

Other clients include General Motors, Ford Motor Company, Chrysler, Honda, NationsBank, National Collegiate Athletic Association, National Basketball Association, National Hockey League Players Association, as well as many others.

I have performed examinations in over 1500 cases and presented sworn testimony in several states on several levels over 100 times; also worked cases from four continents and many countries.

National Media Appearances including:

- Wall Street Journal (front page)
- America's Most Wanted
- The Learning Channel (Medical Detectives)

#### Professional Memberships:

- -Society of Forensic Ink Analysts (Board of Directors & President)
- -Midwestern Association of Forensic Sciences
- -American Society of Testing and Materials

Peer reviewed scientific publications including:

- Technical Report with Case Studies on the Accelerated Aging of Writing Inks, 1998 International Journal of Forensic Document Examination.
- Chapter in Encyclopedia of Crime & Punishment, 2001 Textbook
- Impression by Traced Forgery, 2001 American Society of Questioned Document Examiners (co-author)

# List of Papers and Publications—Erich Speckin

- 1. Obverse-Reverse Intersection of Lines, 1993 Midwestern Association of Forensic Scientists and 1996 American Society of Questioned Document Examiners
- 2. Chemical Removal of Magic Marker on Photocopied Documents, 1995 American Society of Questioned Document Examiners
- 3. A Private Examiner's Response to Ink Age Determination, 1996 American Academy of Forensic Sciences
- 4. Interpretation of Data Obtained in Relative Ink Age Determination Testing, 1997 American Academy of Forensic Sciences
- 5. How Do Forensic Chemists Detect 'Record Tampering'?, 1995 Michigan Lawyer's Weekly, 1995 Virginia Lawyer's Weekly
- Technical Report with Case Studies on the Accelerated Aging of Writing Inks, 1998
   International Journal of Forensic Document Examination, 1999 Canadian Society of
   Forensic Science, 1999 GFS Hamburg, Germany
- 7. The Detection of Mastic on Plastic, 1996 Midwestern Association of Forensic Scientists, 1996 Southwestern Association of Forensic Document Examiners
- 8. More Forensic Solutions to Help Attorneys in Litigation, 1995 Michigan Lawyer's Weekly
- 9. Chapter in Encyclopedia of Crime & Punishment, 2001 Textbook
- 10. Ink Dating Examinations, 2000 NADE journal
- 11. Impression by Traced Forgery, 2001 American Society of Questioned Document Examiners (co-author)
- 12. Response to Criticism of Technique Use in Relative Ink Age Determination, 1999 American Academy of Forensic Sciences

#### ERICH SPECKIN'S COURT CASES AND DEPOSITIONS

94-96 J. Runco Burkhardt v Paul Schneider, DO & Georgetown **OB-GYN Associates** Michigan Case # 95-5755-NH 10-95 J. Klarr Maister v Max Warren Michigan Case # 94-472660-NH 205-96 J. Skinner / R. Kefgen Collins v Hartford Michigan 273-96 J. McGauley State of Indiana v Fred Bledsoe Indiana 310-96 C. Schultz / Ottenwess Rita Mahon v Pontiac Osteopathic Hospital and Jack Whitlow Michigan 119-96 A. Peisner Eileen M. Pohl v Allen M. Peisner Michigan Case # 95-568172-DP 130-96 Kaufman Phillips v Wenco of Michigan, Inc. Michigan Case # 95-13528-NZ 76-96 D. French Albert Lee Williams v Elsie Mae Louise Mather Michigan Case # 95-0103-DO 243-95 M. Heilmann Brown v Henry Ford Health Systems Michigan 130-95 B. Fissel Green v AIM Executive File # 3:90CV7670 1-96 D. LaCombe Nartron v GMC Michigan

Case: 94-421075-CK

305-95 R. Chapman

Reeder v Aileen Sedman, MD

Michigan

Case # 94-1259-FH

2-97 K. Davies

Bryan Dulski v Robert Lowery

Michigan

Case # 96-644866-CH

21-97 M. MacFarlane

Environ Products, Inc. v. Advanced Polymer Technology, Inc. and Leo J. LeBlanc, EBW, Inc. v. Environ Products, Inc.

and Michael C. Webb Case # 95-7209 Pennsylvania

339-96 P. Vestevich

Nancy Ruwe v. NBD

Michigan 95-551, 511-IE

60-95 J. Braddock

Linda M. Adams v. Terry V. Adams

Michigan 96-529596-DM

25-96 E. Eardley

Olga Villa Parra, representative of the Estate of Margarita Ayala v. Richard A. Edlund, M.D.

Michigan 95-3-33585-NH

135-97 H. Joyner

Michael McComb and Mary McComb v. Oakwood Hospital

Case No. 96-632643-NH

Michigan

111-96 T. Thomas

Terrell Thomas v. Ronald A. White, D.D.S.

Case No. 95-530641-NH

Michigan

21-97 M. MacFarlane

Environ Products, Inc. v. Advanced Polymer Technology, Inc.

Case No. 95-7209 Pennsylvania

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135-97 H. Joyner

Michael McComb and Mary McComb v. Oakwood Hospital

Case No. 96-632643-NH

Michigan

185-97 J. Roels

Sanwa Leasing Corp. v. Jacqueline A. Grosser

Michigan

301-96 R. Sollish

Smith Security Corporation v. James M. Copas

Case No. 96-522721-CK

Michigan

22-97 J. Reiter

Cooper v. Subczynski, M.D.

Michigan

98-96 F. Mackraz

Koenig v. Jenny Craig, et. al.

Michigan

139-97 Will Collier

Jefferson Davis Anesthesia v Jennings American Legion Hospital

31st Judicial District Court, Docket No. C-758-95

Jefferson Davis Parish, Louisiana

13-96 Mark Blumer

People of the State of Michigan v Jose Gilberto Higuera 30th Judicial District Court, Docket No. 96-2740-FY

Highland Park, MI

234-95 Regina Meo

Carrie Meyer v City of Centerline Circuit Court - Macomb County

Michigan

226-97 Saul Bluestone

Estate of Harry May, Jr., deceased

Southfield, MI

312-97 Seth Lloyd

Grace Hospital / Elattar Hearing

Michigan

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281-97 Neal Howard

Richardson v. Simmons Gwinnett Co, GA

File number 96C-3966-1

230-97 G. Fletcher

Implant Manufacturing v. Serafin

Michigan

303-96 Cyril Weiner

> Estate of Eric Stubbs File number 96C-3966-1

Michigan

111-97 Jeffrey Zoeller

Deposition on March 2<sup>nd</sup>, 1998

Michigan

Re: Palermino v. Hoisington

251-97 Christine Semanson

Deposition March 31st, 1998

Michigan

Re: Tania Wotring-Gomoll v. Dr. Harkema

281-97 Neal Howard

Trial on April 20th, 1998

Georgia

Re: Richardson v. Simmons (ink 97-39)

328-97 George Sheehan

Sweeney & Sheehan Deposition May 1<sup>st</sup>, 1998

Pennsylvania

113-98 Scott Morgan

> Childers & Zdeb Chicago, Illinois May 20<sup>th</sup>, 1998

169-98 Paul Hildebrand

Vancouver, Canada Re: Diary of John Torok June 15<sup>th</sup>, 1998

211-98 Anita Folino

Deposition

Re: Smith v. Knaysi June 26, 1998 Virginia

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302-97 Greg Herman

Deposition

Re: Kimbrough v. Bernard Alper

July 1, 1998 Michigan

147-97 Steve Mackey

Re: Utica Shopping Center v. Renbergs

July 8, 1998 Oklahoma

253-98 Doug Post

Re: Litton Data Command Systems v. Applied

**Equipment Corporation** 

July 22, 1998 California

190-98 Robert Palmer

Re: Phyllis Bowers September 23<sup>rd</sup>, 1998

348-98 B. Elliot Grysen

Re: Janet Tobler October 23<sup>rd</sup>, 1998

Deposition

309-98 Ronald S. Gaynor

Re: Edgar Matthews v. Elizabeth Johnson

November 2<sup>nd</sup>, 1998

Deposition

190-98 Robert Palmer

Re: Phyllis Bowers November 4<sup>th</sup>, 1998

234-98 Barry Hart

Re: Bryson v. Tamis November 10<sup>th</sup>, 1998

Deposition

364-98 A. Thomas Cole

Re: Ballard v. Baldridge, et al.

November 25<sup>th</sup>, 1998

Deposition

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309-98 Ron Gaynor

Re: Edgar Matthews v. Elizabeth Johnson

December 8th, 1998

378-98 Roy Anderson/Ellis Johnston

Re: Ian Whatley v. Nike, Inc.

January 6<sup>th</sup>, 1999 Deposition – Oregon Case No. CV98-963-AS

427-98 Cyril Weiner

Re: Patricia Calocassides v. Providence Hospital Dr. Blaise Aude

January 18<sup>th</sup>, 1999 Deposition – Michigan File # 0348.029095

317-96 Michael Rinkel

Re: Willie Lee Smith v. Steven B. Rubin, M.D.

January 20<sup>th</sup>, 1999 Deposition File # 60150

282-98 Peter Villari

D'Olio v. Centrone, D.O. February 2<sup>nd</sup>, 1999 Trial – Philadelphia, PA File # BFL95-416

234-98 Barry Hart

Bryson v. Tamis February 17<sup>th</sup>, 1999 Trial – Scottsdale, AZ

CV 96-13262

348-98 B. Elliot Grysen

Re: Janet Tobler March 3<sup>rd</sup>, 1999

Deposition - Spring Lake, MI

459-98 Matt Turner

Goldberg v. Mel Farr March 19<sup>th</sup>, 1999

Deposition - Southfield, MI

402-98 William Seikaly

Debbie Davis v. Raedy, Et. Al

April 12th, 1999

Deposition - Southfield, MI

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229-98 Jerry McGrier Calloway v. Richter April 28<sup>th</sup>, 1999 Trial - Buffalo, NY 151-99

Lillian Lai

Bayer & Pfizer v. Mylan June 17<sup>th</sup>, 1999

Deposition - Washington D.C.

453-98 Michael Cavanaugh

Greater Lansing Association v. Mentzer Etal.

June 30th, 1999 Trial - Lansing, MI

144-99 Mark Smith

Reliance Insurance Company v. Forum Insurance Company

July 9<sup>th</sup>, 1999

Deposition - Philadelphia, PA

422-98 Vivian Demas

> Tilney v. Saphier August 16<sup>th</sup>, 1999

Deposition - Chatham, NJ

339-99 Allen Sobel

Formal Complaint No. 61 (Hon. William Runco)

August 19th, 1999

Trial - Wayne County, MI

214-99 Brad Prochaska

Kyle Wallace v. College Hill OB/GYN

August 31st, 1999 Deposition - Kansas

233-99 Jesse Reiter

Butler, Pitts v. Grace Hospital (Rollock, M.D.)

October 26th, 1999 Deposition - Detroit, MI

148-99 Robert Cantlon

> Troy Police Department November 1<sup>st</sup>, 1999

Trial - Oakland County, MI

199-99 William Morrison

> Shirley Temple v. Ranger November 8th, 1999 Trial - Mesa, AZ

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418-99 Terry Brown

Michael J. Harris December 3<sup>rd</sup>, 1999 Deposition – Michigan

306-98 Jeff Miller

Aptix v. Quickturn Design Systems

January 21st, 2000

Deposition - San Jose, CA

534-99 Neal Howard

Hutcherson January 31<sup>st</sup>, 2000 Deposition – Okemos, MI

\_ -**,** -----,

467-99 Brian McKeen

Vettraino v. Sinai Hospital February 17<sup>th</sup>, 2000 Deposition – Okemos, MI

306-98 Jeff Miller

Aptix v. Quickturn Design Systems

February 24<sup>th</sup>, 2000 Deposition – San Jose, CA

406-99 Jacob Schwarzberg

Clausel (Estate of N. Snead)

March 9<sup>th</sup>, 2000

Deposition - Okemos, MI

10-00 Charlie Meyer

People v. Adrian March 15<sup>th</sup>, 2000

Trial - Antrim County, MI

460-99 A. John Curry

Wilbur C. Curry March 30<sup>th</sup>, 2000

Deposition - Charleston, WV

18-99 Michael D. Vogler

Maten v. Schepke April 7<sup>th</sup>, 2000

Deposition - Okemos, MI

110-00 Leonard (Bud) Siudara

Roop v. Trammel Crowe

April 8th, 2000

Deposition - Oakland County, MI

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110-00 Leonard (Bud) Siudara

Roop v. Trammel Crowe

April 17<sup>th</sup>, 2000

Trial - Oakland County, MI

306-98 Jeff Miller

Aptix v. Quickturn Design Systems May  $9^{th}$  &  $10^{th}$ , 2000

Trial - San Francisco, CA

13-98 Andrew Mychalowych

Estate of Jimmie Ratliff

May 16<sup>th</sup>, 2000

Deposition - Detroit, MI (conducted in Okemos, MI)

356-97 William Abbatt

Juicy Whip v. Orange Bang

May 24<sup>th</sup>, 2000

Deposition - California Federal Court (conducted in Southfield, MI)

507-99 **Ted Riley** 

Brown v. Taji May 25<sup>th</sup>, 2000 Trial - Toledo, OH

422-98 Vivian Demas

Tilney v Saphier July 12, 2000 Trial - New Jersey

401-99 Mike Cavanaugh

Bentley Estate July 28, 2000

Deposition - Lansing, MI

221-00: Harold Ciampoli

September 26, 2000 Trial - Pennsylvania

125-99 Carlos Zaffirini

October 27, 2000

Re: Ana Maria Brittingham Deposition- Laredo, TX

95-00: Laurie Michelson

January 10, 2001

Re: Murray Hill Productions V 20th Century Fox

Trial - Ann Arbor, MI

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95-00:

Laurie Michelson

January 11, 2001

Re: Murray Hill Productions V 20th Century Fox

Deposition - Ann Arbor, MI

258-00:

Nicole Ciandella January 24, 2001 Re: Roger Epstein J. Dr. Trial – Boston, MA

392-00:

Frederick Greco January 31, 2001 Re: Gabeler Trial – Fairfax, VA

95-00:

Laurie Michelson February 26, 2001

Re: Murray Hill Productions V 20th Century Fox

Trial - Ann Arbor, MI

185-00:

Robert Evers March 30, 2001

Re: Lizzack V Markowitz Deposition – Newark, NJ

125-99

Carlos Zaffirini May 8, 2001

Re: Ana Maria Brittingham

Trial- Laredo, TX

133-00:

Alan Polackwich May 30, 2001

Re: Banyon Lakes Corp. V Callaway Land & Cattle Co. Inc.

Deposition - Miami, FL

149-01:

Jesse Reiter

September 10, 2001

Denise Williams/Aviance Holmes V Borgess Hospital

Deposition - Okemos, MI

298-00:

Christine Kocot September 20, 2001 Flatness V McCarthy Trial – St. Louis, MO

533-99:

K. M. Chan

September 26-October 16, 2001

Re: Wang Din Shin V Nina Kung alias T.H. Wang

Trial- Hong Kong

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364-98 A. Thomas Cole

January 23, 2002

Re: Ballard V Baldridge Trial - Phoenix, AZ

369-01

Steve Harris

February 7, 2002

Re: Equal Employment Opportunity Commission V Ethan Allen

Deposition - Cleveland, OH

376-98

Ralph Sirlin

May 9, 2002

Re: Michael Dively v William Beaumont Hospital

Trial - Oakland County, MI

141-02

Brian Ellis

June 6, 2002

Re: Multiut Corp. V Yehuda Draiman

Deposition - Chicago, IL

259-01

David Hopkins

June 17, 2002

Re: Douglas Crocker II V Mary Wilson Crocker

Deposition - Chicago, IL

259-01

**David Hopkins** 

June 20, 2002

Re: Douglas Crocker II V Mary Wilson Crocker

Trial - Chicago, IL

141-02

Brian Ellis August 7<sup>th</sup> - Aug 14<sup>th</sup>, 2002

Re: Multiut Corp. V Yehuda Draiman

3 days testified Trial - Chicago, IL

402-02

Todd Weglarz

February 4, 2003

Re: Terrence v Northville Regional Psychiatric Hospital, Et Al.

Deposition- Wayne County

10-02

Richard Mills Robertson

February 12, 2003

Re: Evans V General Motors Corporation

Deposition - Connecticut

323-00

Mary Ann Kusner

March 5, 2003

Re: Ante nuptial Agreement Trial - West Chester, PA

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326-00 Deborah Sirias

Re: Sargon Enterprises V USC

March 18, 2003 Trial – Los Angeles, CA

418-02 Ross Wilber

Re: Alicia Epps V Continuity Programs Inc. et al.

March 21, 2003

Deposition - Okemos, MI

328-00 Frederic Champnella

Re: Dr. Gregory Derderian V Genesys

March 29, 2003

Hearing - Grand Blanc, MI

206-02 Aaron Wisely

Re: Burmeister V Safeco

May 7, 2003

Trial - Grand Rapids, MI

507-99 Ted Riley

Re: Alisha Brown V Taji Amal Dr.

12-10-04

Trial - Toledo, OH

379-02 Charles Rogers

Re: JJK Industries

2-11-04

Deposition- Houston, TX

412-03 Carl Hamilton

Re: Estela Margo Guerra et al v Sabino Alvarez Sr.

2-13-04

Deposition- Texas

128-03 Justin Goldstein

Re: Stephen Slesinger Inc. V Disney Enterprises Inc.

2-20-04

Deposition - Los Angeles, CA

128-03 Justin Goldstein

Re: Stephen Slesinger Inc. V Disney Enterprises Inc.

2-27-04

Trial - Los Angeles, CA

122-04 Rich Rogers

Re: Dankenbring v Hilton Pollock, M.D.

April 26, 2004 Deposition – Nevada Court Cases Page 13

168-04 Randall Wood

Re: Ciro D. Rodriguez for Congress

May 10, 2004

Deposition - Laredo, TX

204-04 Jack Richards

Re: Fleming Anderson V Thierry Leroux #40928-1

November 11, 2004 Deposition – Okemos, MI

332-04 James Colleran

Re: Price V Combs March 1, 2005 Trial – Scranton, PA

190-04 Nancy VanSant

Re: Escam V Morgan Stanley

June 1, 2004

Arbitration - Miami, FL

140-04 Tricia Legittino

Re: Khosrow Jamshidi V Bear Stearns Inc. & Albert E. Schultz

March 3, 2005

Arbitration - San Francisco, CA

402-03 Allen Philbrick

Re: Auto Owners V Hamilton Oil Co.

May 23, 2005

Deposition - Okemos, MI

203-02 James Colleran

Re: Sweder V Wright, M.D., Et Al

May 25, 2005 Trial – Scranton, PA

62-05 Stephen Crandell

Re: Patricia Gordon, Adm. of Estate of Glen Bolender, deceased V St. Rita's Med. Health Cntr.

July 27, 2005

Deposition - Cleveland, OH

402-03 Allen Philbrick

Re: Auto Owners V Hamilton Oil Co.

September 26, 2005 Trial – Detroit, MI

295-05 Jesse Reiter

Re: Crenshaw v Hutzel Hospital

November 9, 2005 Deposition – Okemos, MI Court Cases

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417-04 Neil Chaness

Re: Salvador M. Mendez Jr. V David Mendez & Sylvia Mendez

January 24 & 25, 2006 Trial – Detroit, MI

290-03 Kenneth Williams

Re: Rachel Hodges V James Pigg, M.D.

March 8, 2006 Trial - Pikeville, KY

128-05 Richard Weir

Re: Linda Petti V Dr. Stefan O'Connor

March 23, 2006

Deposition - Wilmington, DE

63-06 Stefanie Bloch

Re: Azuka B. Anyika V Gertrude Oknokwo

April 18, 2006 Trial - Camden, NJ

16-06 Kathleen Wade

Re: Estate of Paul Smith

July 6, 2006

Deposition - Lansing, MI

128-06 Norman Pylman

Re: Zella Bennett V Ionia County Memorial Hospital & Zafar Iqbal M.D.

August 15, 2006

Deposition - Okemos, MI

80-06 Gerald Thurswell

Re: Shakayla Henderson

August 16, 2006

Deposition - Okemos, MI

317-05 Benedict Casey

Re: Estate of Howard Biddle V Robert Dickerson, M.D.

August 24, 2006

Deposition - Philadelphia, PA

66-06 James Kelley

Re: Marcus Moats-Como V Janie Zart, M.D.

October 6, 2006

Deposition - Detroit, MI

160-06 Judith Susskind

Re: Thoma V Enriquez October 16, 2006

Deposition - Okemos, MI

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317-05 Benedict Casey

Re: Estate of Howard Biddle III V Robert Dickson, M.D.

January 16, 2007

Trial New Jersey

286-06 Carl Hamilton

Re: Hortencia Guerra Margo Et Al v Santiago Gonzalez Jr.

March 19, 2007 Deposition Texas

234-05 Thomas Cunningham

Re: Armament Systems V IQ Hong Kong LTD

March 29, 2007 Deposition Wisconsin

291-06 Steven Crandall

Re: Logan Nalley Et Al V Gene Ireland, M.D. Et Al

April 18, 2007 Deposition Ohio

281-06 Mark Ross

Re: Quality Manufacturing Inc., Et Al V Brian D. Mann, Et Al

April 26, 2007 Deposition Michigan

16-06 Kathy Wade

Re: Estate of Paul Smith

May 17, 2007

Deposition - Tampa, Florida

281-06 Steve Spender

Re: Quality Manufacturing Inc. et al V Brian D. Mann et al

June 22, 2007 Trial – Flint, MI

16-06 Patrick O'Connor

Re: Estate of Paul Smith

June 29, 2007

Trial - Tampa, Florida

# EXHIBIT 22

#### STATE OF MICHIGAN

IN THE CIRCUIT COURT FOR THE COUNTY OF ANTRIM

PEOPLE OF THE STATE OF MICHIGAN,

v.

100

Case No.: 99-3323-FH

DOUGLAS ADRIAN,

Defendant.



EXCERPT OF TRIAL (Testimony of Erich J. Speckin)

Before The Honorable Thomas G. Power

Bellaire, Michigan - Wednesday, March 15, 2000

APPEARANCES:

For the People:

MR. CHARLES H. KOOP (P27290)
Prosecuting Attorney
Courthouse, P.O. Box 280
Bellaire, Michigan 49615

For the Defendant:

MR. CHARLES R. MEYER, III (P36193)
P.O. Box 950
236 1/2 East Front Street
Traverse City, Michigan 49685

REPORTED BY:
KAREN M. CARMODY, CSR-6054, RPR
Official Court Reporter
(231) 922-2773

### EXAMINATION INDEX

WITNESS	DIRECT	CROSS	REDIRECT	RECROSS
Erich Speckin				
By Mr. Meyer	3		69	
By Mr. Koop		51		80

### EXHIBIT INDEX

EXHIBIT	IDENTIFIED	ADMITTED
TT - CV of Erich J. Speckin	3	4
UU - Erich J. Speckin report	48	49
VV - Graphs	82	82

1	Bellaire, Michigan
2	Wednesday, March 15, 2000 - at 8:54 a.m.
3	(Court, counsel, defendant and jury
4	present)
5	THE COURT: Mr. Meyer, your next witness,
6	please?
7	MR. MEYER: Erich Speckin.
8	ERICH SPECKIN
9	At 8:54 a.m. a witness herein, having been duly sworn was
10	examined and testified under oath as follows:
11	DIRECT EXAMINATION
12	BY MR. MEYER:
13	Q. Could you tell the jury your name, sir?
14	A. Erich Speckin, S-P-E-C-K-I-N.
15	Q. And where are you employed?
16	A. At Speckin Forensic Laboratories, in Okemos, Michigan.
17	Q. How long have you been working there?
18	A. About seven years now.
19	MR. MEYER: Your Honor, I was going to
20	rather than going through his three page vitae, I was
21	going to introduce the exhibit and hit the high points,
2,2	unless the prosecuting attorney has an objection.
23	THE COURT: I don't see anything inappropriate
24	in introducing the CV.
25	Mr. Koop, have you had a chance to voir dire on

expert testimony under MRE 702, is that the individual must demonstrate knowledge, skill, training, or experience. Although the term expert is used in variation by counsel, it is not a particularly high threshold, it does require the dysjunctive knowledge, skill, training, or experience, but it doesn't require that someone be the most qualified individual. require more than a simple lay acquaintance with the subject at issue, certainly this gentleman is well qualified in the field of ink and document analysis. don't recall whether it was this witness, or his father, who's been previously qualified in ink and document analysis in this Court with regard to the grease analysis and infrared work that was done here. It does appear that Mr. Speckin has a chemistry degree. While his lab doesn't own the equipment that was used here, he's familiar with it, has used it from time to time, and does claim an ability to review the spectra. The Court does believe then the minimal requirements for qualifications as an expert have been met here. Although, certainly the Court would be more enthusiastic if this was an ink case. But, minimal requirements have been met.

You can proceed.

24 BY MR. MEYER:

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Q. Now, returning to the instruments of a forensic lab like

- yours. If you had an unlimited budget how many instruments could you conceivably purchase to do work that could some day prove useful in doing some kind of a test, we talking a couple dozen instruments?
  - A. I would say there are probably four that I would like to purchase and use. We could purchase hundreds of them.

    But, I would say that there are probably four or five that I personally like. I'm sure everybody would have a wish list if we had an unlimited budget.
- 10 Q. Are these expensive machines?
  - A. Our infrared system that we use for document and ink analysis was 6000 -- 50 to 60,000. I don't recall that that's common. 15,000, to me that's expensive.
    - Q. To me too. You don't have the resources of the state.

      THE COURT: I'll strike the comment.
- 16 BY MR. MEYER:

- Q. Now, in connection with this case, let's return first of all to the exhibit which a -- there it is, Defense C.

  This is the state crime lab policy on methods for examining automotive fluids. And why don't you read

  Paragraph 11 to the jury, then I'll ask you some questions about it, please?
  - A. Okay. IR is good for generic identification of most automotive fluids, lube greases, axle greases, motor oil, transmission fluid, brake fluid, antifreeze.